IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication SEPTEMBER 1, 1960

Carl Burke

* Twin Coach Team Develops--

New Ways to Design Folded Metal Shapes p. 59

How to License Abroad p. 37

Is Foreign Car Boom Over? p. 49

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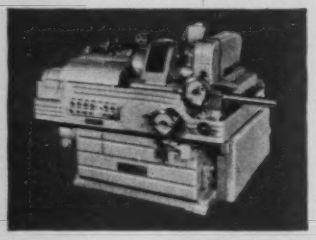
THREAD GRINDING COSTS TOO HIGH?

Here's How a Modern Ex-Cell-O can Increase Production and Lower Your Labor Costs

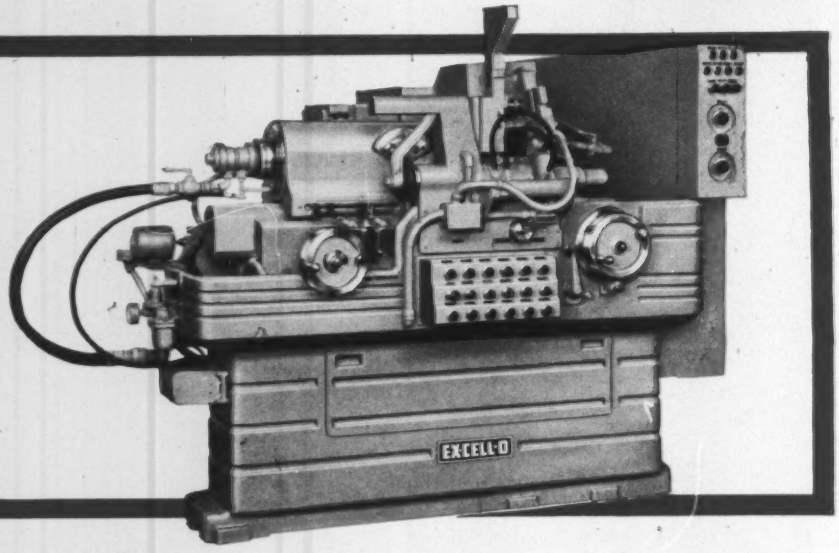


1939—Style 39 Ex-Cell-O Internal Thread Grinder, then the fastest of its kind, produced 17 automotive steering gear ball races per hour. It had power wheel dresser, automatic dresser compensation and automatic wheel feed.

1946—The part's the same, but the manufacturer has turned to a postwar Ex-Cell-O Style 39-A Precision Thread Grinder with fully automatic grinding cycle, including automatic wheel dressing at predetermined intervals. Operator simply loaded the part, reset the size handwheel and pressed the start button. Production increased to 24 parts per hour.

1960—Modern Style 39-A, today produces the same basic part but now at a rate of nearly 60 parts per hour. This powerful, versatile machine has a high-speed workhead, high-frequency Bryant Grinding Spindle, automatic loading, unloading and cycling. It requires only the part-time attention of one unskilled operator.

MMT PE
MODERN MACHINE TOOLS
PRODUCTION EFFICIENCY



TOMORROW—Will you have a similar long-run part, or perhaps pinions, worms, taps, thread gages, lead screws, missile components or other special parts that cannot be rough- or finish-ground economically on your present equipment?

Your local Ex-Cell-O Representative can show you how modern Ex-Cell-O Precision Thread Grinders can substantially reduce the cost of producing a wide variety of your large and small threaded parts. Call him today, or write direct for details on the complete line of Ex-Cell-O Internal, External and Universal Thread Grinders for every toolroom and production job.

SEE EX-CELL-O'S BOOTH 946, NMTBA EXPOSITION

60-35

EX-CELL-O FOR PRECISION

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Machinery Division

EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN

KNOW YOUR ALLOY STEELS . . .

This is one of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

Thermal Stress-Relieving of Alloy Steels

In the production of alloy steel bars and parts made of alloy steel, stresses are sometimes set up, and these stresses must be relieved before optimum results can be expected. Two general types of stress-relieving are practiced—thermal and mechanical. In this discussion we shall consider only the former.

There are several important reasons for thermal stress-relieving. Among these are the following:

(1) The first and most fundamental purpose is to reduce residual stresses that might prove harmful in actual service. In the production of quenched and tempered alloy steel bars, machine-straightening is necessary. This induces residual stresses in varying degrees. Bars are usually stress-relieved after the straightening operation. When the bars are subjected to later processing that sets up additional stresses, subsequent stress-relieving may be necessary.

(2) A second major purpose of thermal stress-relieving is to improve the dimensional stability of parts requiring close tolerances. For example, in rough-machining, residual stresses are sometimes introduced, and these should be relieved if dimensional stability is to be assured during the finish-machining.

(3) Thermal stress-relieving is also recommended as a means of restoring mechanical properties (especially ductility) after certain types of cold-working. Moreover, it is required by the "safe-welding" grades of alloy steels after a welding operation has been completed.

Alloy bars are commonly stress-relieved in furnaces. Temperatures under the transformation range are employed, and they are usually in the area from 850 deg to 1200 deg F. The amount of time required in the furnace will vary, being influenced by grade of steel, magnitude of residual stresses caused by prior processing, and mass effect of steel being heated. After the bars have been removed from the furnace, they are allowed to cool in still air to room temperature.

In the case of quenched and tempered alloy bars, the stress-relieving temperature should be about 100 deg F less than the tempering temperature. Should the stress-relieving temperature exceed the tempering temperature, the mechanical properties will be altered.

Items other than bars (parts, for example) can be wholly or selectively stress-relieved. If the furnace method is used, the entire piece is of course subjected to the heat; selective relieving is impossible. However, if a liquid salt bath or induction heating is used, the piece can be given overall relief or selective relief, whichever is desired.

Detailed information about stress-relieving is available through Bethlehem's technical staff. And remember that we can furnish the entire range of AISI standard alloy steels, as well as all carbon grades.

This series of alloy steel advertisements is now available as a compact booklet, "Quick Facts about Alloy Steels." If you would like a free copy, please address your request to Publications Department, Bethlehem Steel Company, Bethlehem, Pa.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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The IRON AGE

September 1, 1960—Vol. 186, No. 9

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News of the Industry

FOREIGN LICENSING

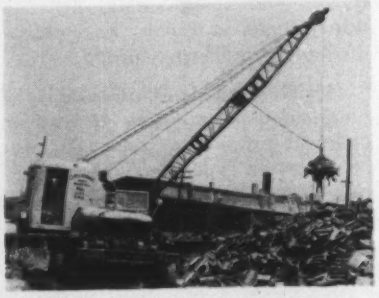
Open New Markets — Smaller companies may find that licensing their products or processes to foreign manufacturers is the door to foreign trade. But caution is required and many factors must be considered. P. 37

STAINLESS T-BIRD

One for Show—A stainless steel Thunderbird is a showpiece of the versatility of this corrision-resistant metal. It's expected to last almost indefinitely. P. 39

SCRAP DEALERS

Planned Diversification — Scrapmen are planning for a future that



appears dim. Research is aimed at improving the scrap, while dealers aim at branched-out business. P. 40

ALUMINIZED STEEL

Extending Dates — Producers of aluminized steel are extending delivery dates by six weeks now. A rash

Metalworking

Cover Feature

FOLDED METAL: Many pattern possibilities suggest new uses for corrugated designs made of folded metal. So reports the New Products Development Dep't, Twin Coach Co., Buffalo, developers of a new corrugating process. P. 59

of buying by automakers is responsible. Producers are thinking more seriously now of expanding facilities. P. 41

AUTOMOTIVE

Compacts vs. Imports—Sales of foreign import cars are staggered by success of compacts. But foreign makers are fighting back. P. 49

Engineering-Production Developments

GIANT FURNACE

For Vacuum - Melted Steels — Slated to go into production late this year in a giant-size consumable-electrode, vacuum-melting furnace. It may be the largest furnace of its type in the world. Crucible size can go as large as 60 in. diam. However, the first ingots to be produced will be 40 in. P. 62

STAINLESS POWDERS

More Uses — New developments have extended the market for parts made from stainless powders. The heat and corrosion resistance of these metal-powder parts serves a variety of industrial needs. Adding a lubricant improves mechanical properties for structural use. P. 66

SOUND WELDING

Huge Bridge Job—Welding the caisson cutting edges for two huge bridge towers presents a real engineering challenge. The structures are made of manganese-vanadium steel plate — a low-alloy, high-strength material. Total welded length is about 65,000 ft. P. 67

NEW REFRACTORIES

Maintain Blast Furnace — Blast furnace linings can take only so much punishment from heat before they wear out. A new family of castable refractories increases furnace-brickwork life—up to three years more service. P. 68

STRETCH FORMER

Halts Scrap Loss—Stretch forming is reaching new heights to meet space-age demands. A radical former reduces scrap from 25 to 1 pct during a sheet-forming job. Its built-in tensile tester calculates each sheet's strength. P. 70

Market and Price Trends

RUSSIAN STEEL

Fast Progression—O. Mikhailov, of Russia's State Science and Technology Committee, says the USSR is gaining fast in steel production. He claims Soviets are leaders in new blast furnace techniques. P. 42

MACHINE TOOLS

Orders Drop—July orders for machine tools show a sharp drop from June. Adding to the sharp drop in domestic business is a severe jolt in the export market. Cause of the slump? Builders hope users are holding off only until they see the new tools at the Exposition. P. 53

STEEL SUMMARY

Some Improvement—Day-to-day volume of new business is picking up, although at little more than a seasonal rate. Steelmakers are puzzled by a low rate of auto business. October now shapes up as the best month in second half. P. 93

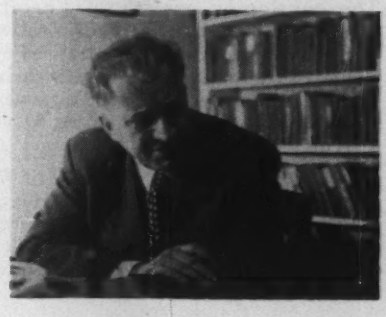
PURCHASING

Furnace Makers Push Service—Industrial furnace builders are trying to give buyers the best equipment at the most economical price. Right now they are holding the price line, but increases may come. P. 92

NEXT WEEK

EXECUTIVE FAILURES

Causes Examined — Recent research into causes of executive failures has shown some surprising findings. Dr. F. J. Gaudet, of Stevens Institute of Technology, analyzes these findings in his first of three articles.



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announces the

acquisition of

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MANUFACTURING COMPANY

Torrington, Connecticut

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The continuing growth of Pheoll takes many directions. Today . . . it heads Eastward . . . bringing within immediate range of New England industry the expanded manufacturing, warehouse and sales facilities of Pheoll's newest acquisition, Progressive Manufacturing Division of The Torrington Co., Torrington, Conn.

This new subsidiary... **Pheoll of New England, Inc.**...is pledged to uphold and advance the *Service, Technical Know-How* and *Engineering Leadership* that has set Pheoll in the forefront as one of the leading fastener sources serving industry throughout the U.S. and Canada.

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Foreign Aid Puzzle: It's Time for a Solution

Last week we argued that Uncle Moneybags was often a soft touch and that some thinking should be done about our future course. All of our total wealth will not buy utopia.

It is true that military foreign aid has a lot in its favor, far more perhaps than the spending of billions for civilian foreign aid.

Free enterprise and hard work, coupled with imagination and invention, made this nation great. Our democratic heritage came from a rugged group of men and women. They knew what they wanted—and worked for it. Our laws and many of our ideas of freedom came from Britain and other European nations which had learned the hard way.

Over the years this country has progressed to the point where it is—and make no mistake about it—copied, admired, envied, and hated by many other nations of the world. But what works here may not work elsewhere.

The bureaucracy which has been built up in departments which have billions to play with is a natural trend. Where figures stagger the imagination, how can anyone expect the host of workers, idea-mongers, social workers, and opportunists to put on the brakes?

This is old familiar ground. But we must trod it again to understand the main points. Any help that the U. S. A. gives should be coordinated with the nation to be helped. It is of no use to spend time, energy, and money to do things which are contrary to the basic habits and aims of the so-called underprivileged nation.

By and large, the missionaries probably did more for almost nothing than we have done with billions. It would seem that we need more people in government — replacing many now there—who know the mores of the countries assisted by the U. S. A. They should know the history, the language, and the lowdown. Above all, they ought to be aware of the fact that they are spending hard-earned coin of Joe Doakes in the U. S. A.

Of course, there are dedicated people in departments assigned to foreign aid duties. But there are many who ought not to be there. The idea that foreign aid is so sacred it ought not to be checked into thoroughly is nonsense.

As we said last week, it is time to look into the whole question of American foreign aid, in the United Nations—and in any other place where it appears we do not know what we are doing.

Tom Campbell

Editor-in-Chief

FOR A SMOOTH ID CYLINDER TUBE THAT'S JOB-MATCHED

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B&W *Lectrosonic steel cylinder tubing*

With B&W LECTROSONIC you get . . .

- guaranteed maximum micro-inch finish on the ID to meet cylinder tubing requirements
- uniformity of wall thicknesses and close ID tolerances
- guaranteed physical properties to insure adequate strength
- tough, lightweight electric-resistance-welded cylinder tubing that costs less than seamless in comparable sizes.

Manufactured under a rigid system of quality control B&W LECTROSONIC Cylinder Tubing is a sound, uniform tube which will fabricate easily and give optimum service life. For more information, call your local B&W District Sales Office, or write for Bulletin T-459. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pennsylvania.

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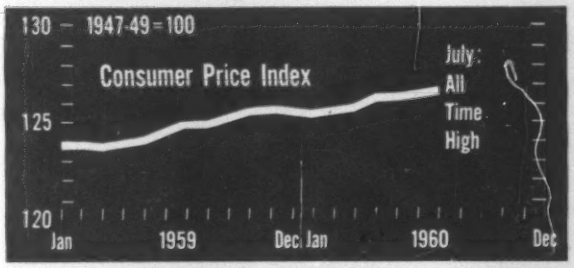
When Will Correction End?

Political crosscurrents compound the problem of analyzing business trends. Administration backers are taking the rosy view with "don't rock the boat" implications. Labor leaders are piling on the gloom with the old "time for a change" slogan.

As it stands now, the mild correction which business is going through now should end next spring. Best thought for metalworking is the probability of a strong uptrend in durables, housing, and defense spending later next year.

Cost-of-Living in July At New High

The Cost-of-Living Index hit a new record high in July, the fifth consecutive month of record-setting. But the rise is not considered inflationary in spite of the



lofty 126.6 level. The 0.1 point rise from June is the smallest June-July rise since 1954. And the Index should drop in August with lower produce prices. An important point: Of the more than 1 million workers whose pay is tied to the Index, only about 150,000 will get 1¢ per hour raises. The small gain failed to put others into the raise category.

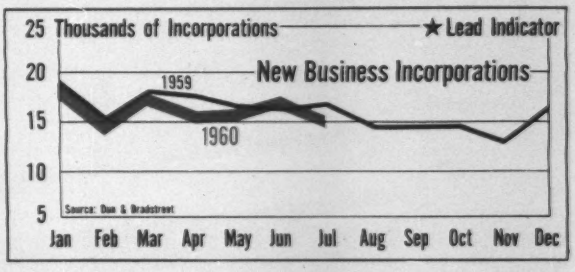
Costs Go Up in Common Market

Some indications are starting to appear that European Common Market countries may follow the U. S. pattern of higher wages and higher prices as their economies develop. A National Industrial Conference Board study shows that price rises in ECM countries have been greater than in the rest of Europe. Labor shortages and union demand for higher wages there have a familiar ring to U. S. businessmen.

Fabricator Orders Up Slightly

Orders of fabricated structural steel continue at a fair pace and backlogs indicate good business for at least four months. However, shipments are running ahead of new orders, even after a moderate increase in new business. According to the American Institute of Steel Construction, bookings in July totaled 270,198 tons. Shipments totaled 301,249 tons.

Mid-Summer Dip Hits Business Plans



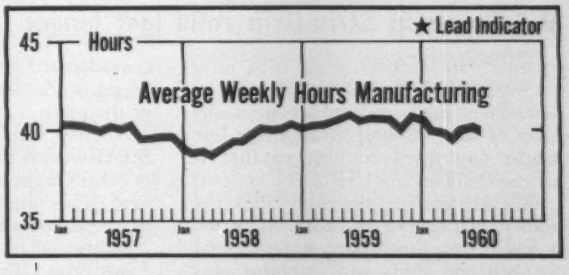
The current business pessimism apparently is affecting new business plans. The number of new business incorporations fell in July to the lowest level since February this year. Dun & Bradstreet reports new incorporations in July at 14,676, compared with 16,676 in June. The number of new businesses for the first seven months hit 112,623, down 6.2 pct.

Construction Contracts Up

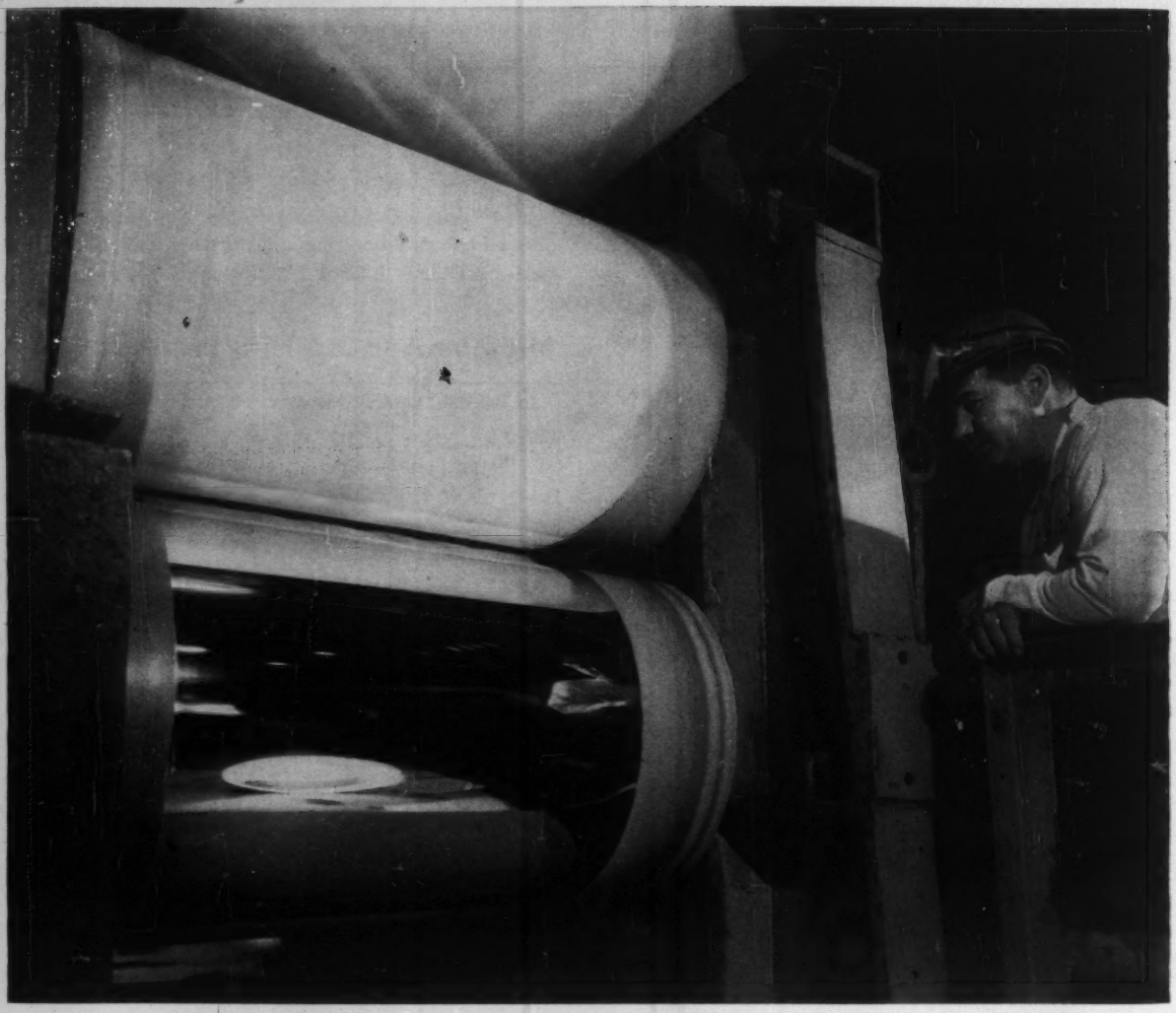
Heavy engineering put July construction contracts at the highest level this year. F. W. Dodge reports contracts of $3.6 billion in July. Housing was down slightly, but heavy engineering contracts were 44 pct over a year ago.

Slowdowns Cut Work Week

The seasonal drop in auto production brought the factory work week down 0.2 hours to 39.8 in July.



This decline is considered about normal. But, as reported, paid vacations kept the primary metals group from reflecting the actual situation. Weekly earnings, however, were up $1.49 from a year ago. The $91.14 weekly figure reflects a drop of 46¢ from June.



Rubber stays dull to keep tin plate shiny

B.F.Goodrich Strip-Grip rolls last longer, reduce slippage

THOSE are tension bridle rolls on a high-speed electrolytic tin plating line. Their job is to keep a continuous strip of steel moving through the line under controlled tension so that it neither buckles nor stretches too tight.

But for years, these rubber-covered rolls were a terrific headache. After just a few hours, the rubber was polished smooth and shiny with rubbing plus high speed. Then the rolls couldn't grip, the steel smeared and couldn't be used for tin cans.

B.F.Goodrich engineers worked on the problem, and came up with a new, improved rubber compound. Rolls covered with this special rubber don't glaze, don't slip, don't mar the finish of the plate.

At the steel mill shown above, B.F.Goodrich Strip-Grip rolls last 100 per cent longer than the rolls previously used. The appearance of the tin plate has been consistently good.

Maintenance costs have gone way down, too. That's because the roll cover keeps its dull finish permanently. Strip-Grip rolls have operated for periods of three or four months, without maintenance of any kind, in mills where conventional rolls needed almost daily attention.

B.F.Goodrich distributors have full information on the steel mill rolls described here. And, as factory-trained specialists in rubber products, they can answer your questions about the many products BFG makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-878, Akron 18, Ohio.*

B.F.Goodrich

RUBBER-COVERED ROLLS

Steel Labor Study Rushed by Mitchell

Secretary of Labor Mitchell's study of industrial relations in the basic steel industry is moving closer to completion. And as it does, it comes under mounting criticism that it is being rushed.

MITCHELL: In a rush?

Mr. Mitchell is pushing for a Dec. 1 deadline. But he will be lucky if he gets the final report by Jan. 1. Critics say if he did not want the study complete before the Eisenhower Administration leaves, a better job could be done.

The study will treat no segment —government, industry, labor—as a sacred cow. It will deal basically with the Government's role in collective bargaining. Right now, the Labor Dept. is receiving its first reports on such phases of the survey as earnings, foreign competition, changing technology and production.

UAW: NLRB Decision Goes Against Kohler

Kohler Co. of Wisconsin lost a major decision in its six-year battle with the UAW. The NLRB found the company guilty of unfair labor practices prolonging the strike.

The plumbing supply company was ordered to rehire most of the 1700 strikers, if they apply. It must also bargain with the UAW.

Both parties have appealed the decision. The company wants it reviewed. The union wants workers fired for strike activity to be rehired.

TWU-PRR: No Easy Solution to Dispute

Railroad labor problems are long-standing. And there is no easy way out despite strong management stands.

In the Pennsylvania Railroad strike threat, the dispute between the Transportation Workers Union and the Systems Federation is more than three years old.

Meanwhile, industry could be caught in the middle. About 30 pct of the Pennsy's traffic is in shipments in or out of the steel mills.

The Pennsy threat came on top of the strike of the Union Railroad Co. by the USWA, which operates the U. S. Steel subsidiary railroad serving its Pittsburgh area mills.

In each case, management assumed firm stands. The issues are involved and long-standing. Even settlements are not likely to dispose of all issues. This means more troubles when contracts expire.

IAM: Job Security Sought

What demands will unions make at the bargaining table in months ahead? Emphasis will be on increasing job security for workers.

An indication of this emerged last week when the executive council of the International Association of Machinists revealed an eight-point program to **"protect members . . . from mass unemployment as a result of automation."**

IAM will offer the plan to 1500 delegates, representing one million workers in 16,000 companies, at its convention opening in St. Louis next week.

Here's what the program seeks:

1. **Advance notice** and consultation whenever employers plan major changes;

2. **Right to transfer** to jobs in other plants as well as jobs within a plant, with adequate moving allowances;

3. **Training for new jobs** at full pay and at no expense to workers;

4. **Preservation of previous rates** of pay for workers who have been downgraded, greater SUB or severance benefits for laidoff workers;

5. **Provision for early retirement** with adequate pension;

6. **Continuation of fringe benefits** during layoff;

7. **Negotiation of new job classifications** and rates of pay wherever automation has increased skill requirements, responsibility, or demands on workers;

8. **Equitable distribution** of productivity gains through higher wages, more leisure time or other benefits.

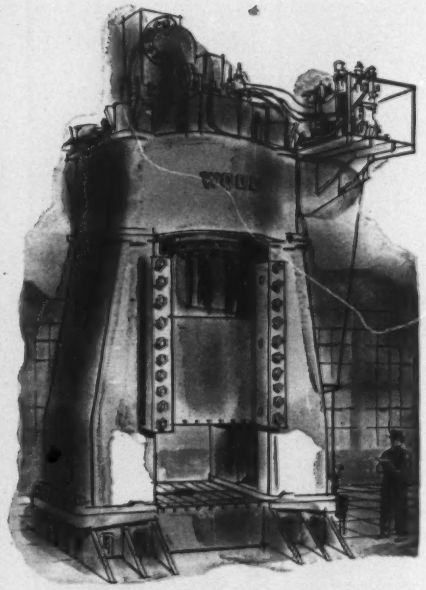
Union officers also suggest pressing for a shorter work week "as rapidly as the needs and resources of the nation permit."

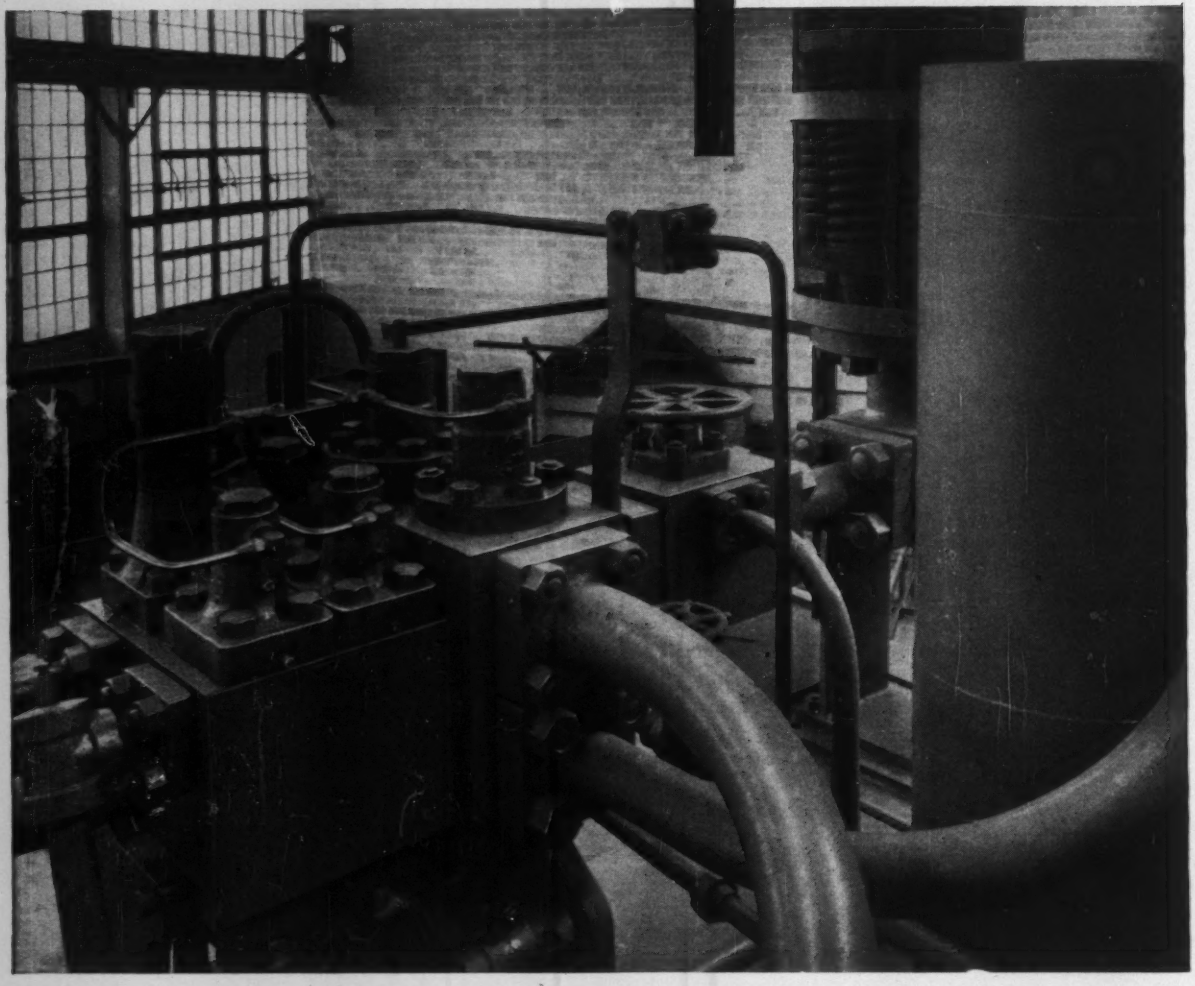
Treat 'em rough, These Wood Valves can take it.

Presses take a beating? No need to worry about the effect on your hydraulic system if Wood Valves are at work. They're built to handle the toughest jobs. For example, this 3″x1½″ special main control valve is installed on a 1500 ton forging press. Operating conditions demand extremes in acceleration and deceleration, yet the valve assures shock-free, efficient service due to its inverse flow design. Control of the ram is precise, accurate . . . with shockless decompression. You can also see a fully balanced throttle valve and a 3″x7″ shock alleviator, further examples of Wood's complete line of quality high-pressure valves. Write today for complete information.

R. D. WOOD COMPANY

PUBLIC LEDGER BUILDING • PHILADELPHIA 5, PENNSYLVANIA





By R. W. Crosby

Depreciation Response Good

Industry has surprised the government with its cooperation in efforts to straighten out tax laws on depreciation.

U. S. Treasury officials say response to more than 11,000 depreciation questionnaires sent out to large and small businesses is "excellent; much better than we expected."

Though some businesses couldn't meet today's deadline on their voluntary answers to the survey, they surprised Treasury officials by calling up and saying: "Give us a little more time and we'll get the answers to you."

They got the extra time.

The government officers said most of the d e l a y was because methods of depreciation vary so much it was difficult for industry to answer survey questions.

So far there is a great "disparity" in the answers by companies on how they h a n d l e depreciation. There are even greater differences on what the firms feel should be done to change depreciation laws.

One of the biggest surprises, at least to the government people, was that a segment of industry replied that p r e s e n t depreciation laws were "reasonably satisfactory." They expected all gripes.

More Competitive Bids For Defense Business

New pressures will be put on the Pentagon to advertise more defense c o n t r a c t s for competitive bids whenever possible.

More competitive bidding was the key recommendation to come out of a nine-year congressional study of defense procurement.

Only 21 pct of all defense contract dollars—which total $25 billion each year—are now obligated through formal advertising for bids. The remainder are negotiated.

This lack of balance in procurement money brings continual criticism from Congress and industry. Unless the Pentagon acts, criticism may lead to new defense buying legislation.

President's Tariff Power Questioned

The Supreme Court has been asked to decide whether or not the President has the power to modify recommendations of the U. S. Tariff Commission in setting import tariffs and quotas.

The U. S. Court of Customs and Patent Appeals has held that the President may accept or reject Tariff Commission recommendations, but may not modify them. The government disagrees.

Housing Bills Stalled

Time has run out on the billion dollar plus housing bill labeled a "must" earlier in this congressional session.

Nothing short of a miracle could pull two stalled bills, a Senate bill calling for $1.7 billion and a House bill for $1.3, into passage.

Cries from backers that the bill is "desperately needed" by the construction industry and that new housing starts now are at their lowest ebb since 1958 failed to move committeemen in both houses who couldn't agree what housing was needed.

Export Promotion Lacks Funds

President Eisenhower's export expansion program continues to falter for lack of money.

First, it was the Commerce Dept. pressing Congress for $1.8 million to start the export drive.

Now it's the State Dept. Douglas Dillon, Undersecretary of State, says unless it c o m e s up with $1,042,000 in additional funds it will be "impossible" for the State Dept. to carry out its part.

Rump Session Backfires

The Democrat-inspired rump session of Congress backfired on the party.

The Democrats started out on the offensive and ended up on the defensive. The big gainer: Vice President Nixon.

Even worse—as far as the Democrats are concerned—is a new twist on an old saying. The Republicans

NIXON: He gained .

are now applying the label "do-nothing Democratic Congress."

Democrats called the extra session to build a record to campaign on, but they accomplished little of what they hoped for.

prediction

NEVER BEFORE

SO MANY TREND-SETTING

DEVELOPMENTS

NEW DEVELOPMENTS IN AUTOMATED STEELMAKING

●

ADVANCED EQUIPMENT NOT EXHIBITED PUBLICLY BEFORE

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NEW OXYGEN PROCESSES — INCLUDING AJAX, L-D, ROTOR AND KALDO

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REPORT ON SOVIET FERROUS METALLURGY

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NEW TECHNIQUES IN INCREASING BLAST FURNACE OUTPUT THROUGH ELEVATING TEMPERATURES

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OTHER NEW DEVELOPMENTS IN COMBUSTION . . . ELECTRICAL . . . SAFETY . . . ROLLING MILL . . . AUTOMATIC CONTROL . . . AND MECHANICAL PRACTICES

BE ONE OF 15,000 WHO WILL ATTEND to see and hear discussed the many advanced developments of today that will be standard operating practice in the future. Four full days of technical sessions (42 in all) will be held concurrently with AISE's largest Exposition (206 exhibitors, 15% more area than the largest previous show).

No man concerned with steelmaking or plant maintenance can afford to miss this opportunity of reviewing *the new, the technical, the significant!*

1960 IRON AND STEEL CONVENTION AND EXPOSITION

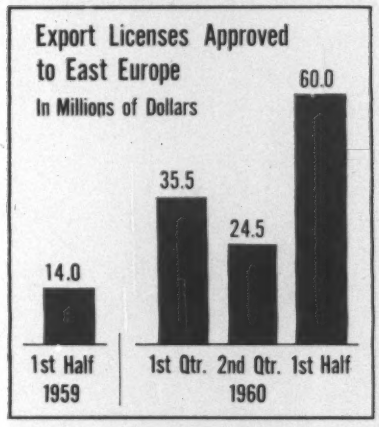
Sponsored by Association of Iron and Steel Engineers, 1010 Empire Building—Pittsburgh 22, Pennsylvania

SEPTEMBER 27-28-29-30, 1960 • CLEVELAND PUBLIC AUDITORIUM

Metalworking Exports To Iron Curtain

Some facts and figures on licensing of exports to Iron Curtain countries are eye-openers.

Even though licenses to Eastern Europe were down one-third in the second quarter, the total is formidable. Secretary of Commerce Mueller states that $24.5 million in proposed exports to Eastern Europe



were licensed in the second quarter. This compares with $35.4 million in the first.

Applications approved in the first half of this year, close to $60 million, contrast with only $14 million in the same period last year.

Some commodities: Machine tools to make auto cylinder blocks in the USSR, valued at $5.3 million; cold-rolled steel sheets, $5.5 million, to USSR and East Germany; $2.38 million in compressors to the USSR.

Some items rejected: Polyethylene to Czechoslovakia and USSR; helicopters to the USSR.

International Air Cargo

International air cargo to and from overseas continues to grow as shippers won't wait for the boat.

For the Port of New York Authority, overseas air cargo was the fastest growing segment of foreign trade last year and has continued to be this year. For the first six months of this year, traffic was 28,000 tons, a 41 pct increase over a year ago.

For most airlines, from 25 pct to 50 pct of shipments are in machinery and machine parts.

British Order Books Full

In contrast to hard-pressed U. S. steelmakers, British steelmakers have full order books for the current quarter and even substantial bookings for the first quarter of 1961.

Products in greatest demand are structurals and shapes for heavy construction.

But there is some fear that the impact of tighter credit restrictions on consumer goods, including cars, may cause the demand for sheets to slip later this year.

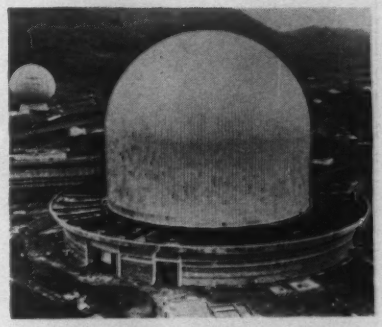
UAR Looks to U. S.

While the United Arab Republic, under Premier Nasser, continues to needle the U. S., it is nevertheless strengthening its buying position here.

The UAR, entering its so-called second five-year plan ahead of schedule, is emphasizing steelmaking, textiles, and irrigation. The UAR reportedly will be making purchases of equipment here.

Direct Reduction Goes Into S. America

The biggest application of direct reduction so far is shaping up for South America. The Venezuela government has contracted for a Strategic-Udi installation for its mill on the Orinoco. Initial plans call for a rotary kiln and modification of electric smelting capacity to the Strategic-Udi design. Ultimately, the mill is supposed to have capacity of more than one million tons.



Atoms for India

India is also entering the nuclear power field.

This nuclear research center near Bombay covers 2000 acres and its $20 million reactor is cited by Indian scientists as one of the largest producers of radioisotopes. Canada suppplied the equipment for the Canada-India nuclear reactor.

Tool Steel Makers Cite Low Pay Abroad

U. S. makers of tool steel have warned the U. S. Tariff Commission that rising tool steel imports are threatening to export American jobs.

The tool steel industry here points out that low wages in foreign countries are the big factor in enabling imports to undersell U. S. tool steel.

Comparative hourly wage costs cited by the industry among world makers of tool steels: U. S., $3.14; Canada, $2.45; Sweden, $1.12; United Kingdom, $0.92; Belgium, $0.82; West Germany, $0.76; France, $0.52.

Aid from Field Offices

Dept. of Commerce field officers are getting refresher courses to help them assist exporters and would-be exporters.

Exporters can now put many questions to the field office managers and not have to wait for answers from Washington.

UNIFORMITY

To a dancer, uniformity of performance is essential. Her very reputation and success depend upon it. Steel users, too, are equally concerned, both with consistently high standards for their products, and with the dependable uniformity of the materials from which their products are fabricated.

That's why so many users of steel specify Inland Cold Rolled Sheets . . . confident each order for a particular end use will be UNIFORM in quality from shipment to shipment. For Inland studies its customer's requirements—knows their operations and equipment—"tailor-makes" Inland Sheets to perform uniformly, time after time after time.

Fabrication of juke box fronts involves lancing and expanding to create intricate designs; make a low cost, attractive, finished product.

World globes can be lithographed flat, *then* drawn. Areas, distorted when flat, become proportional—even if embossed in relief.

Fast, efficient production of spun light reflectors is possible, despite their severity, with uniform Inland Cold Rolled Sheets.

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Stainless Honeycombs

Ceramic platens help to shape stainless steel honeycombs. These platens form a vital link in a new tooling process that turns out preformed stainless honeycomb panels up to 7 by 28 ft. The entire brazing, conditioning and aging cycle is handled in a single, low-cost tool.

Unit Checks Control Tape

Test runs often prove to be bottlenecks in programming a tape-controlled production run. This is especially true when prototype approval is required. A plotter-verifier unit eliminates the need for costly test runs. The new unit converts tape codes into part drawings. It completely verifies a control tape prior to release.

Checks Chemical Wastes

Using chemical and spectrographic techniques to control chemical waste is hailed as a major advance. The system quickly detects the concentration of metals in waste fluids which originate from plating work. The technique is more accurate than previous hand testing procedures and takes one-tenth the time.

Seals Casting Pores

Impregnation and paint-base coating of magnesium castings can be combined into a single operation. The process allows for a reduced current dribble of 20 to 30 minutes at the end of the normal anodizing period. During the dwell, anodizing continues in the pores of the casting. Result is a seal that will withstand air or water pressure of 40 lb or more and a minimum heating of 700°F.

Plastic Pickle House

Among the facilities recently added at International Nickel's Huntington Plant, is a new plastic pickle house. Constructed of translucent plastic, it limits corrosion attack on the surroundings. External lighting points up another feature which will relate lower plant maintenance. Acid attack on wood and steel construction, a problem throughout the industry, led to the change.

Magnets Replace Hooks

Magnets replace pins, clamps and hooks on automated paint lines at a Chrysler Corp. assembly plant. The magnets support parts ranging in size from small trim moldings to 36-lb floor pans, on any point of contact. Twenty-four magnets are welded to a rectangular frame which in turn is hung on conveyors.

Columbium Serves as Fuel

Growing interests in Columbium stem from its possible use as a fuel for compact or gas-cooled reactors. Columbium alloy, containing 20 pct by weight uranium, shows excellent tensile strength and hardness at temperatures in the 1600°F range. Present day fuels swell or are unserviceable above 1200°F.

Raises Impact Properties

British research finds that the low-temperature impact properties of medium carbon steel are improved by ladle deoxidation with aluminum, mischmetal and calcium-silica manganese. Hardenability and welding properties are not effected by mischmetal additions.

Cuts Smoke Problem

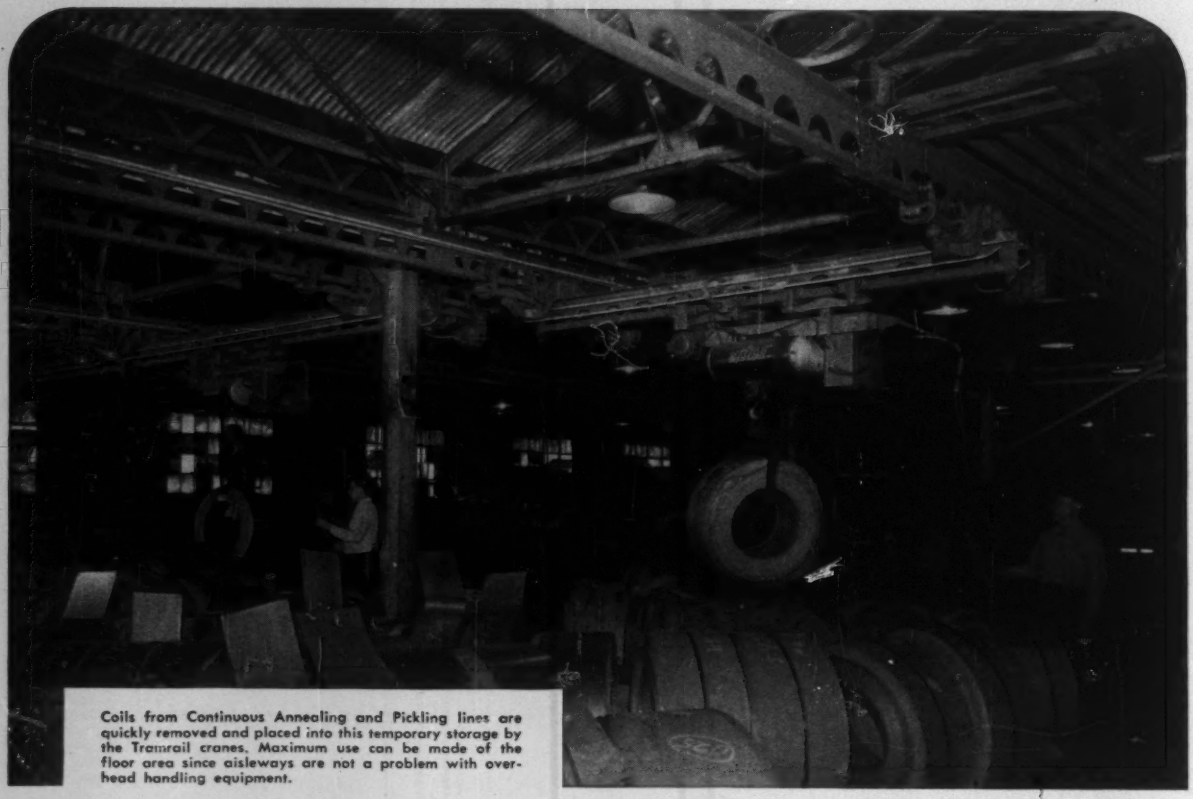
A new method of smoke control eliminates 75-pct of the smoke associated with oxygen injections for openhearths. The method introduces an inhibiting agent through the roof along with the oxygen. Tests at an Ohio mill indicate the method is effective.

Stops Waste at Strip Mill

Russians are now becoming cost conscious. By installing cybernetic controls on steel strip lines they save 22,000 tons per year. Waste ends are almost eliminated. The unit computes the most rational program for cutting required sizes and sends instructions to the flying shears.

Tramrail Cranes BOOST Strip Production

Speed Handling—Cut "Down Time"—Aid Safety



Coils from Continuous Annealing and Pickling lines are quickly removed and placed into this temporary storage by the Tramrail cranes. Maximum use can be made of the floor area since aisleways are not a problem with overhead handling equipment.

AS a leading producer of high quality alloy strip steels, mostly of light gauge, the Superior Steel Corp., Carnegie, Pa. has secured definite production advantages and greatly improved overall plant efficiency through abundant use of Cleveland Tramrail cranes.

As the work is primarily that of rolling, annealing, pickling and handling, to obtain maximum production from their equipment, it is necessary to keep it in operation as many minutes out of the day as possible. This means that there be no delays in handling the coils of strip to and from the mills. It also means that the mill rolls must be changed in the least possible time. The Tramrail cranes have proven of great success in fulfilling these requirements and reducing "down time" to a minimum.

They have also proven to be a great aid to the workers' welfare. Being fully motorized, they have practically eliminated all manual lifting and moving. As a result, worker fatigue has been reduced and safety improved.

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OVERHEAD MATERIALS HANDLING EQUIPMENT

Not the Case

Sir—We appreciate the praise rendered American Marc, Inc., in your August 11 issue for the company's efforts in the Diesel Engine Industry. There is, however, a headline accompanying the story which has caused us some embarrassment. The headline states "American Marc Expects $400 Million in Sales." Such is not the case. The figure $400 million was an industry-wide estimate on my part and not intended in any way to reflect American Marc sales or potential sales. I realize the article states the facts correctly but, unfortunately, the headline could create an erroneous impression—Denis Kendall, President, American Marc Inc., Inglewood, Calif.

■ **We referred, of course, to industry sales, not just American Marc's. —Ed.**

Reproduced

Sir—We have read with great interest a recent article, reproduced from your magazine in the American Gas Assn. magazine, entitled, "Computer: Key to Predicting Blast Furnace Behaviour." As a matter of fact, we are ourselves doing some research on this particular subject, and would appreciate very much your sending us five copies of the article.—D. C. Lefebvre, Sr., French Power Bureau, Washington, D. C.

■ **Copies will be sent.—Ed.**

Unique

Sir—"Our Next President: Lord Have Mercy on Him," the editorial appearing in a recent issue of The IRON AGE, was superb. It was not only well written, but it contained a unique approach to the matter. I would like your permission to reprint the article in both of the employee publications I edit—the "Bessemer Bulletin" and the "Union Railroad News."—Albert E. Brinkley, Bessemer & Lake Erie Railroad Co., Pittsburgh, Pa.

■ **Permission granted.—Ed.**

For Proof

Sir—I liked your editorial "The New Frontiers: What's So New About Them?" I would like to give copies of this editorial to those who seem to think there is no difference between the two platforms. Could you see your way clear to send me 25 reprints? — I. Nalewaja, I.N. Machine Shop, Monticello, Minn.

■ **Some reprints have been sent. —Ed.**

Excellent

Sir—We have just read your excellent feature on "Cutting Oils and Coolants," and our sales force has expressed a desire for reprints of the article. We would like, if possible, to have 25 reprints. Numerous comments were made about your outstanding magazine and you may be assured that we will be reading future issues.—R. Edward Smith, Cal-Tek Industries, Los Angeles, Calif.

■ **Reprints are enroute.—Ed.**

"Monday and it's only 10:30. Boy, is this week dragging!"

WIRE FOR SUDDEN SERVICE

ON SOUTHERN FASTENERS

The wire you see in this photograph will make a multitude of machine screws. This is only a very small portion of the enormous stock carried in Southern Screw's modern six-acre plant in Statesville, North Carolina. All this stock and all this space means that Southern's manpower, machines and materials are ready to give "sudden service" to your order regardless of its size.

Southern specializes in USA-made fasteners — makes nothing else. This is your guarantee that your fastener problems are Southern's only interest.

If you want sudden service on quality fasteners, plated or plain, Phillips or slotted, standards or specials, get in touch with the Southern Screw distributor, or wire, phone or write to Southern Screw Company, Telephone: TRiangle 3-7213, Statesville, N. C.

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Speed
Versatility
Capacity
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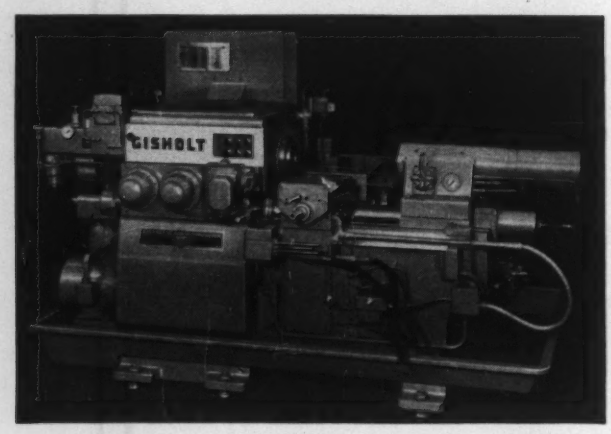


Gisholt No. 12 Automatic Chucking Lathe

You don't have to sacrifice one advantage for another because here is an ideal combination of all in the industry's most modern high-production automatic chucking lathe.

This Gisholt No. 12 is quickly set up to save you time and money on continuous, high-speed production or a wide variety of parts in small lots. It can take practically any part up to 16½" in diameter.

COST-CUTTING VERSATILITY. With 420 spindle speeds ranging from 40 to 2600 r.p.m. and an infinite selection of feeds, it gives you top efficiency in all phases of every job—cutting costs all the way.

INCREASES OPERATOR PRODUCTIVITY. Each machining step is handled in rapid automatic sequence—freeing your operator to handle additional machines.

GREATER POWER, GREATER ACCURACY. Constant h.p. motor (up to 40 h.p.) on the No. 12 takes full advantage of today's most advanced cutting tools and tooling techniques. Greater weight and rigidity allow heaviest cuts at punishing speeds without vibration.

COMPLETE RANGE OF ACCESSORIES. Front, rear, auxiliary and overhead slides can be used; angular cuts are easily made; JETracers can be used with greatest efficiency. Automation can be incorporated—from simple loading and unloading to gaging and sorting of finished pieces.

Your Gisholt Representative will gladly show you how the No. 12 Automatic Chucking Lathe will pay for itself in your plant. Call him, or write for Bulletin 1213.

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin

Investigate Gisholt's Extended Payment and Leasing Plans

Turret Lathes • Automatic Lathes • Balancers • Superfinishers • Threading Machines • Factory-Rebuilt Machines with New Machine Guarantee

FATIGUE CRACKS

Warning Signals

You may have noticed some of the charts in our Business Forecast feature (see p. 7) are starred and labeled "Lead Indicator."

A few of our sharp-eyed readers have picked this up and asked for an explanation. Why should these charts get special attention?

Forecast—Well, it's one way we have of pointing out the more advanced indicators of **future** business direction. Most business analysts and economists agree (unusual in itself!) that there are about seven or eight business indexes which run months ahead of other statistics in forecasting business trends.

These lead indicators include: Business failures, average hours worked per week in manufacturing, residential and nonresidential building, industrial stock prices, new incorporations and commodity prices.

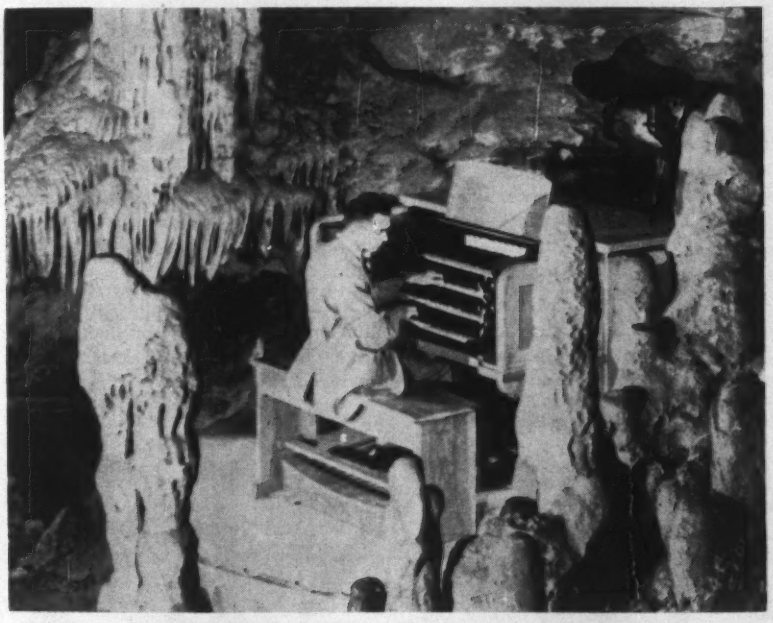
Turning Points — In Business Forecast we plan to bring you periodic reports on the doings of these lead indicators when they take a significant turn for the better or worse. So keep that in mind as you check this week's lead indicators: Weekly hours worked in manufacturing and new incorporations.

Music From the Deep

When the Stalacpipe Organ sounds through the Caverns of Luray, Virginia (see photo), modern steel is playing a part.

The reason: Small rods of Allegheny-Ludlum alloy steel are bolted through the rock formations to generate the tones. The rods are fastened close to tiny wire-wound magnets. When an electronically controlled hammer strikes a stalactite, the combination generates a tone. These impulses pass into a powerful amplifying system.

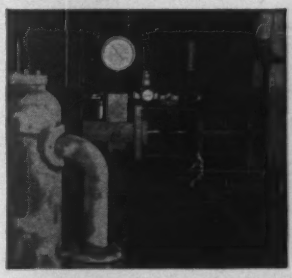
Inventor and organist is Leland W. Sprinkle, Sr., who developed the idea while touring the caverns six years ago.



SEATED AT THE CONSOLE: Leland W. Sprinkle, Sr., brings music from the stalactites in the Caverns of Luray, Va., as he plays on the "Great Stalacpipe Organ." (For details, see story above, right.)

WANT RELIABLE HYDROSTATIC TESTING TO 50,000 PSI?

Aldrich Air-Driven Hydraulic Pumps are rugged, compact... the perfect answer for production or laboratory needs . . . Operate on normal plant air . . . Immediate shipment from factory stock.



FOR HIGH PRESSURE VESSELS—Maker of unfired pressure vessels tests production units with Aldrich air-driven hydraulic pump, in accordance with A.S.M.E. Boiler and Pressure Test Code.

OR CASTINGS—Castings and forgings for missile, nuclear, and other industries are tested in this rig on a production-line basis. Source of hydraulic pressure is an Aldrich pump. This unit has capacity of 12,100 psi. Other pumps available for pressures to 50,000 psi. Special units to 100,000 psi.

Aldrich air-driven hydraulic pumps are dependable, economical to operate and easy to install. Write today for Data Sheet 36 (6-inch stroke) or Data Sheet 36A (3-inch stroke).

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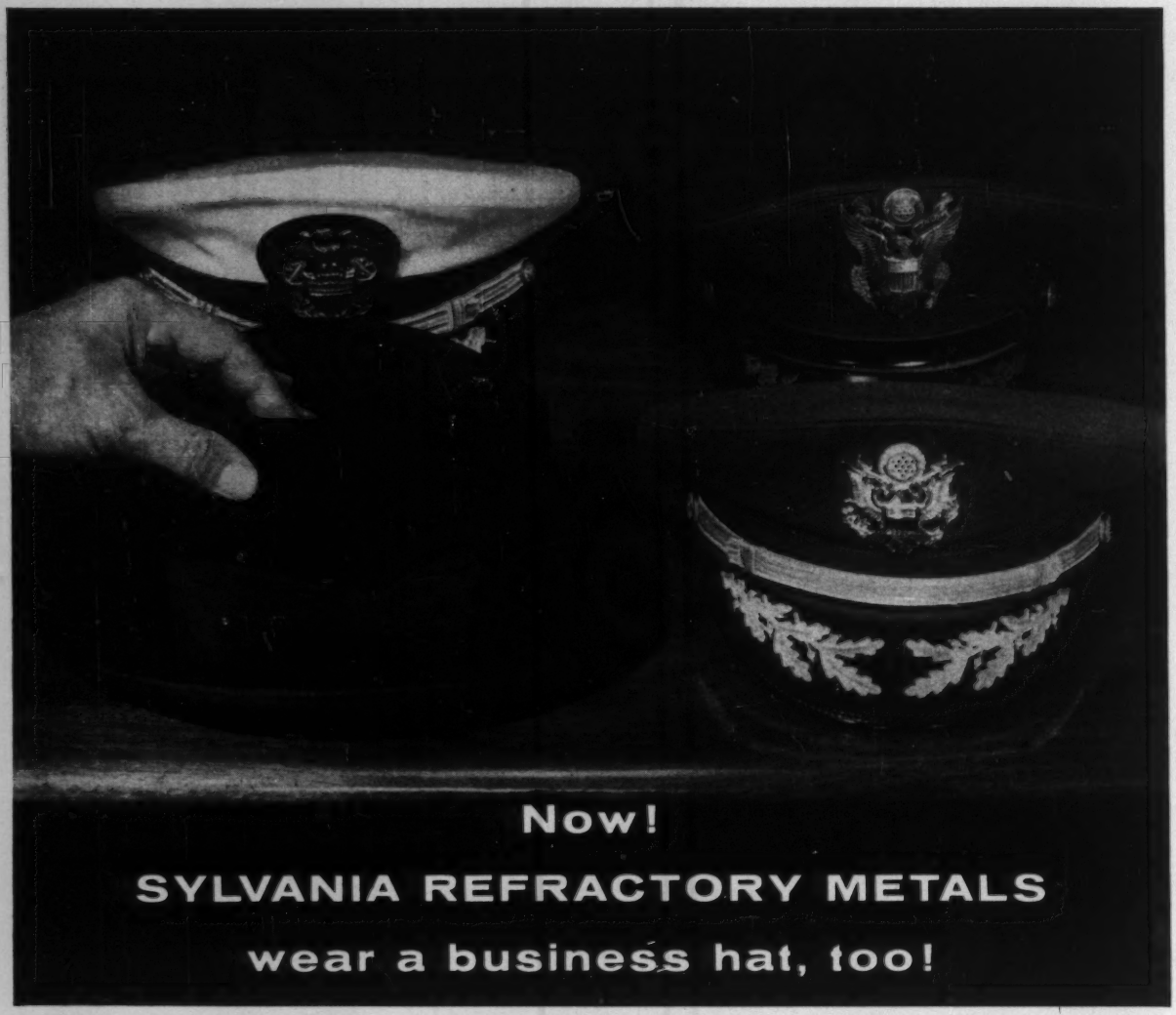

Now!
SYLVANIA REFRACTORY METALS
wear a business hat, too!

The same top-quality Sylvania tungsten and molybdenum used for government and military projects are now opening up new avenues of applications to all industry!

These metals, able to withstand extremely high temperatures, can be specified in both large- and small-sized billets for arc casting and forging. Or if specifications require, they may simply be machined down to final tolerances.

You can use these metals in an almost endless number of ways. Some of the potential applications are in gas turbines, jet engines, extruded airframe members; and in die-casting dies including hot-work tools, boring bars, tool shanks, and grinding quills. Others include molds and ladles for testing other metals such as iron and steel, plastic-working dies, piercing points, heat-exchanger parts such as piping, heat shields and structural parts for the nuclear energy industry, welding electrodes, and glass-manufacturing equipment.

Take full advantage of the quality Sylvania builds into its tungsten and molybdenum ingots—for *your* products. Write Chemical & Metallurgical Division, Sylvania Electric Products Inc., Towanda, Pennsylvania.

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Subsidiary of **GENERAL TELEPHONE & ELECTRONICS**

COMING EXHIBITS

Machine Tool Exposition—Sept. 6-16, International Amphitheatre, Chicago (National Machine Tool Builders Assn., 2139 Wisconsin Ave., Washington 7, D. C.)

Production Engineering Show—Sept. 6-16, Navy Pier, Chicago, (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Coliseum Machinery Show — Sept. 7-15, Chicago. (Contact: A. B. Perkins, 2216 South Hill St., Los Angeles 7, Calif.)

Iron & Steel Show — Sept. 27-30, Cleveland Public Auditorium, Cleveland, O. (Association of Iron & Steel Engineers, 1010 Empire Bldg., Pittsburgh 22.)

Metal Show—Oct. 17-21, Convention Hall, Philadelphia. (American Society for Metals, Metals Park, Novelty, O.)

Die Casting Exposition & Congress—Nov. 8-11, Detroit Artillery Armory, Detroit. (The Society of Die Casting Engineers, 19382 James Couzens Highway, Detroit 35.)

MEETINGS

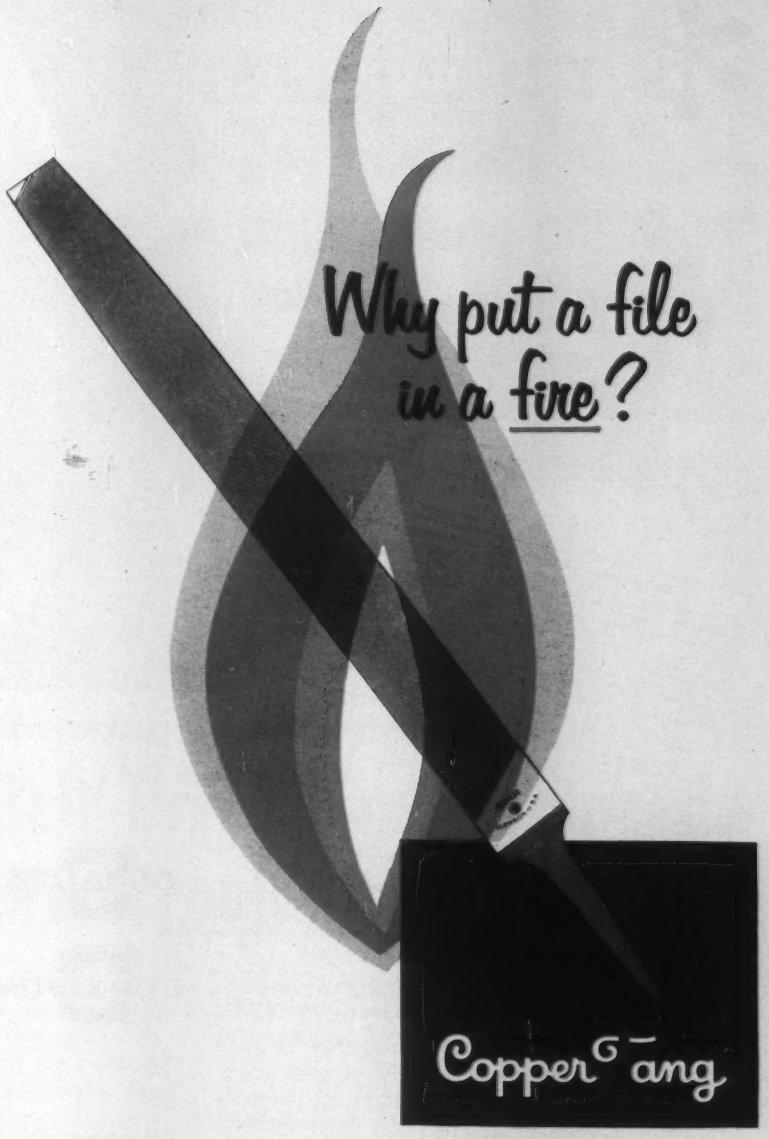
SEPTEMBER

American Machine Tool Distributors Assn.—Annual meeting, Sept. 3-4, LaSalle Hotel, Chicago, Association headquarters, 1500 Massachusetts Ave., N. W., Washington 5, D. C.

Assn. of Lift Truck & Portable Elevator Mfrs.—Fall meeting, Sept. 12, The Cavalier Club, Virginia Beach, Va. Association headquarters, One Gateway Center, Pittsburgh 22, Pa.

Electronic Industries Assn. — Fall conference, Sept. 13-16, French Lick-Sheraton, French Lick, Ind. Association headquarters, 1721 DeSales St., N. W., Washington, D. C.

American Die Casting Institute—Annual meeting, Sept. 14-16, Edgewater Beach Hotel, Chicago, Insti-



To toughen it so that it will cut faster and easier... and last longer. Of course, you can't "just put a file in a fire" and hope for the best. To give your file the properties you want, you must give the steel carefully controlled scientific heat treatment in a molten lead bath. You have to bring it to just the right temperature... keep it there just the right amount of time... and temper it to just the right degree of hardness. This is the way you make a rugged, dependable file. This is the way Clemson Star "Copper Tang" Files are made.

Newest addition to the quality line of Clemson Star metal cutting tools, "Copper Tang" Files are individually checked and tested before being released from the factory. Check as many as you choose. You'll *never* find a defect.

For information, contact your local Clemson Star Authorized Distributor. He'll gladly give you all details on new "Copper Tang" Files ...and the other outstanding Clemson Star metal cutting tools. Call him today.

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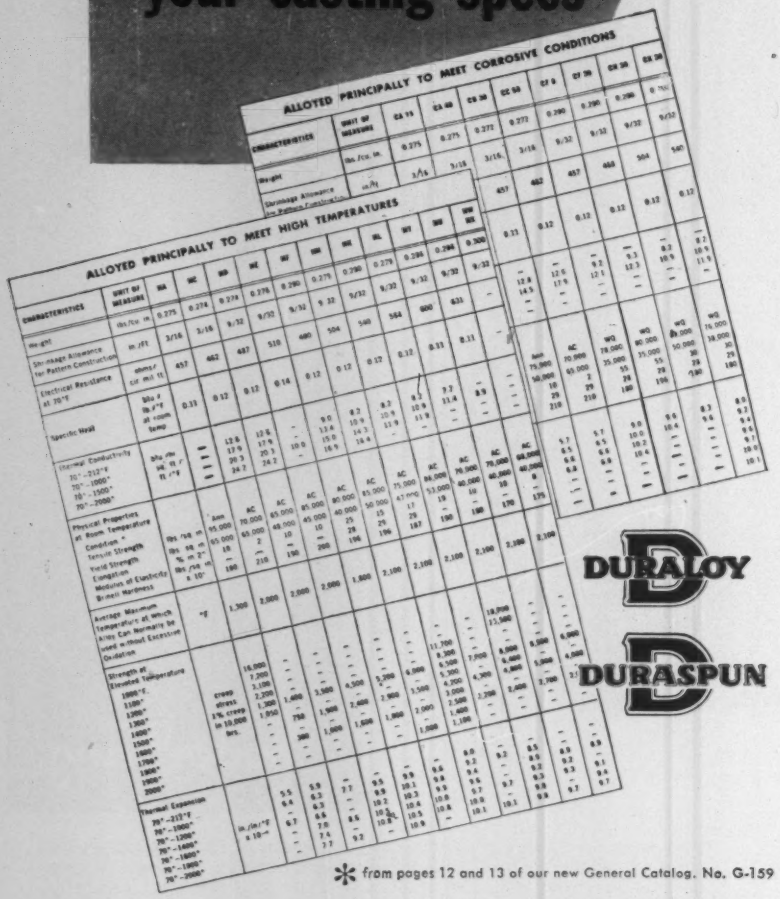
BAND SAW BLADES • HOLE SAWS • FILES • CLEMSON HAND MOWERS

2941

TABLES to help you select the proper alloy for your casting specs



✻ from pages 12 and 13 of our new General Catalog. No. G-159

— and there's lots more useful information about high alloy castings in our up-to-date catalog describing Duraloy Service. SEND FOR YOUR COPY.

As one of the pioneers in both static (1922) and centrifugal (1931) high alloy castings, we have a wealth of experience to focus on your high alloy casting problem. Send for our catalog, study it, and then let us help you get the best alloying combination to solve your corrosion, high temperature and/or abrasion problem.

The DURALOY Company

OFFICE AND PLANT: Scottdale, Pa.

EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.

CHICAGO OFFICE: 332 South Michigan Avenue

DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.

MEETINGS

tute headquarters, 366 Madison Ave., New York.

National Foundry Assn. — Annual meeting, Sept. 22-23, Edgewater Beach Hotel, Chicago. Association headquarters, 53 W. Jackson Blvd., Chicago.

Porcelain Enamel Institute, Inc.— Annual meeting, Sept. 25-28, The Greenbrier, White Sulphur Springs, W. Va. Institute headquarters, 1145 19th St., N. W., Washington, D. C.

Farm Equipment Institute—Annual convention, Sept 25-28, The Statler Hilton Hotel, Dallas, Tex. Institute headquarters, 608 S. Dearborn St., Chicago.

American Welding Society — Fall meeting, Sept. 26-30, Pittsburgh. Society headquarters, 33 West 39th St., New York.

OCTOBER

Metal Lath Mfrs. Assn.—Fall meeting, Oct. 6-7, The Greenbrier, White Sulphur Springs, W. Va. Association headquarters, Engineers Bldg., Cleveland.

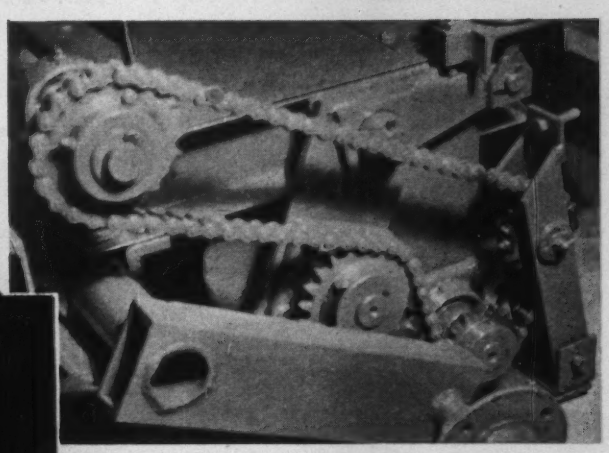
The Electrochemical Society, Inc. —Fall national meeting, Oct. 9-13, Shamrock Hotel, Houston, Tex. Society headquarters, 1860 Broadway, New York.

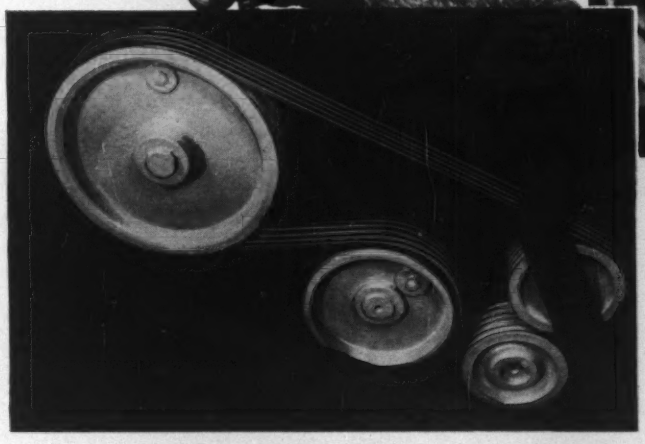
American Gas Assn.—Annual convention, Oct. 10-12, Atlantic City. Association headquarters, 420 Lexington Ave., New York.

Pressed Metal Institute — Annual meeting, Oct. 10-14, Shawnee Inn, Shawnee-On-Delaware, Pa. Institute headquarters, 3673 Lee Rd., Cleveland.

Marking Device Assn. — Annual convention, Oct. 12-14, Hotel Roosevelt, New York. Association headquarters, 912 Chicago Ave., Evanston, Ill.

Steel Boiler Institute, Inc. — Fall meeting, Oct. 12-14, The Greenbrier, White Sulphur Springs, W. Va. Institute headquarters, 1308 Land Title Bldg., Philadelphia.





FORMER DRIVE: The high speed operation of Gehl's Cure-All Hay Conditioner caused failure of the roller chain drive.

PRESENT DRIVE: Both the limited space and high speed requirements were met with this Gates Super HC V-Belt Drive.

Gehl Brothers Manufacturing Company Finds

Super HC V-Belt Drive handles speeds chain drive couldn't take!

Roller chain drives on Gehl's Cure-All Hay Conditioners **"would not stand up under the speed of operation." Yet conventional V-belts that would fit into the space available could not handle the working load for this outstanding line of forage harvesting equipment.**

The design problem remained a tough one until the introduction of the Gates Super HC High Capacity V-Belt early last year. Then the Gates Field Engineer, working closely with Gehl Engineers designed the new drive shown above.

"The Super HC V-Belt Drive has eliminated need for shear pins and clutches, has increased efficiency, and lowered maintenance costs," is the pleased report from Gehl personnel.

Take advantage of Super HC on your equipment

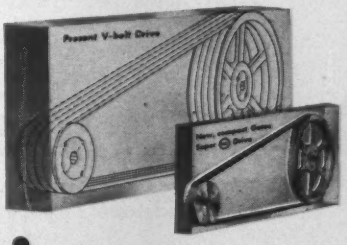
Whenever you have a drive change on a new model or are replacing belts or sheaves, let your Gates Representative show you how Super HC Drives can reduce sheave diameters 30% to 50%, drive space up to 50%, drive weight and cost as much as 20%.

A handbook, "The Modern Way to Design Multiple V-Belt Drives," is yours for the asking. Simply contact your Gates Representative listed in the Yellow Pages.

TPA 505

The Gates Rubber Company, Denver, Colorado
Gates Rubber of Canada Ltd., Brantford, Ontario

Gates *World's Largest Maker of V-Belts*



Gates Super HC V-Belt Drives same hp capacity in smaller "package"

AT DEVLIEG BOOTH 431 • NMTBA EXPOSITION

new series

"Designated the model 'H,' our new Jigmil series provides greater range, is more rugged, easier to operate and more accurate."

"Available in spindle sizes ranging from 3" to 5", the new 3H, 4H and 5H machines greatly increase JIGMIL range for precision boring, milling, drilling and other operations. The new series introduces simplified controls, thermal control of main spindle bearings for increased accuracy . . . wider bed and table for added stability and working range . . . stainless steel way covers for positive protection . . . features that reach a new standard in JIGMIL accuracy, ruggedness and simplicity of operation. And like all JIGMILS, the 'H' series is available with the DeVlieg Diatrol direct dial dimensioning system or Tapac* —DeVlieg's own system of automatic tape control."

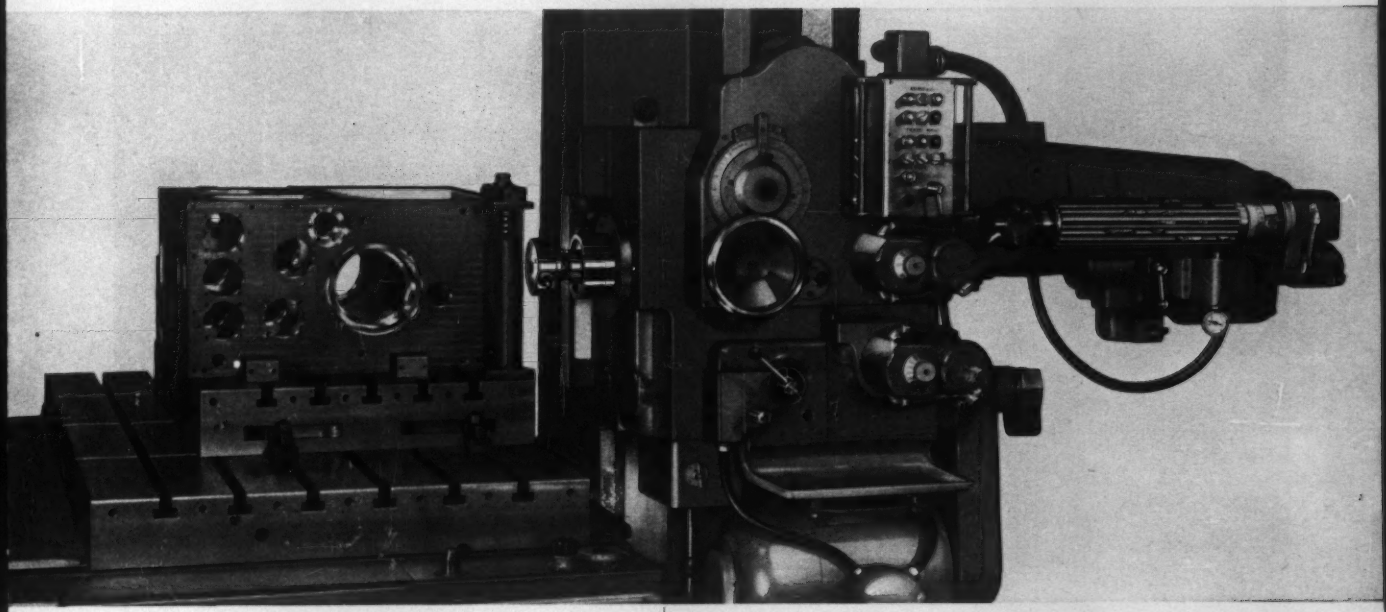
R. A. JERUE
Vice President in Charge of Engineering

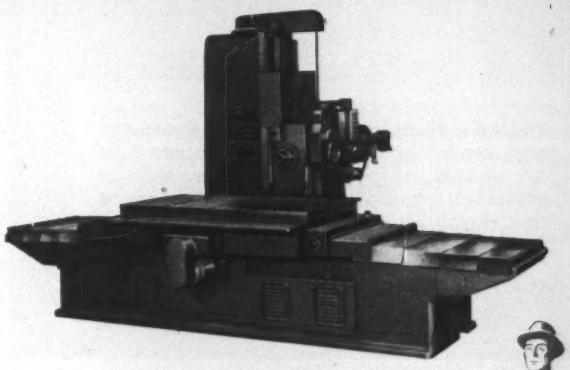
**Tape Automatic Positioning And Control*

DEVLIEG MACHINE COMPANY, FAIR STREET • ROYAL OAK, MICHIGAN

"H" Jigmils®

with Duplitrol • Diatrol • Tapac





Rewarding revelations in automatic precision await your next visit to Fair Street

MMT-PE

See new "H" series JIGMILS with DeVlieg Diatrol and DeVlieg Tapac in operation at the NMTBA Exposition, Chicago, September 6-16th.

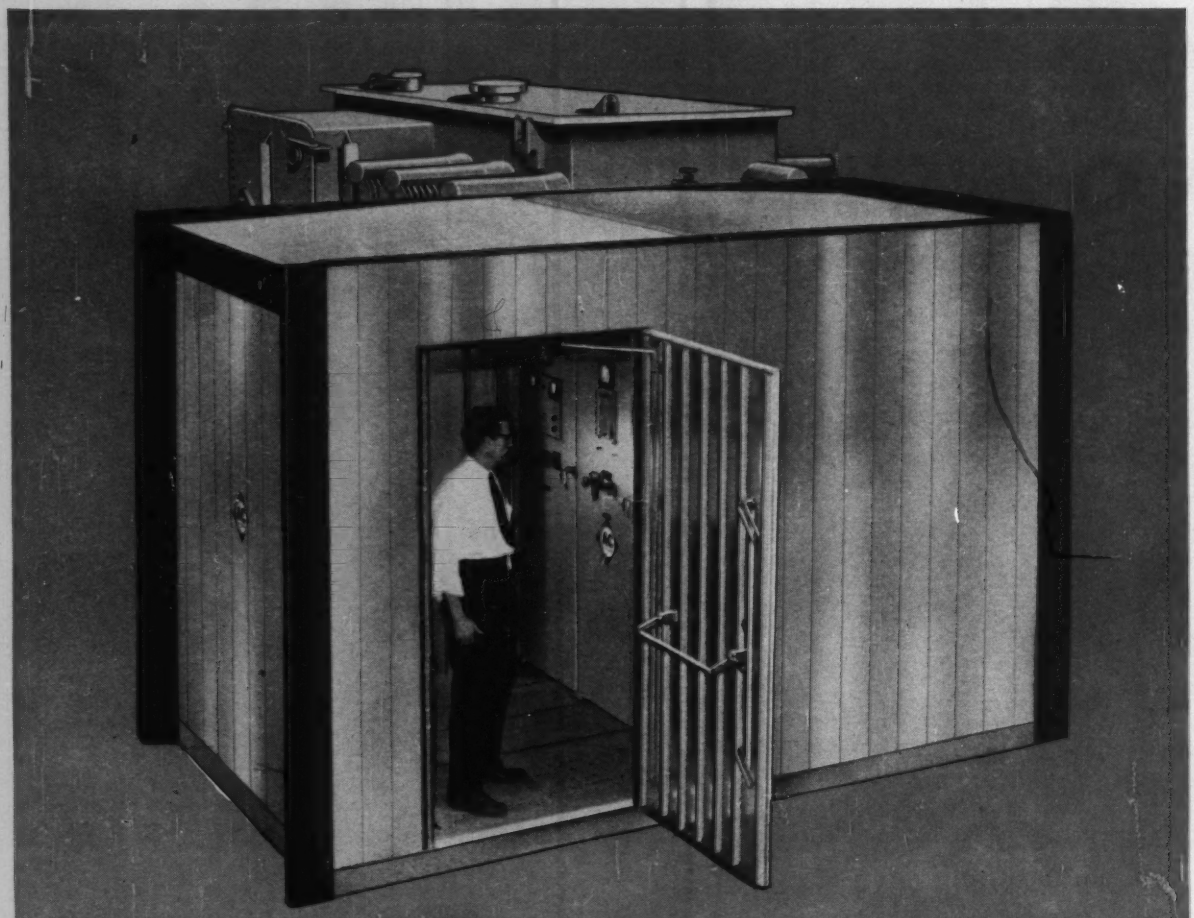
Also, see in operation the new Micropoint Precision Tool Grinder—first grinder capable of absolute control of tool geometry.

DeVlieg

SPIRAMATIC JIGMILS®

ACCURATE HOLES AND FLAT SURFACES IN PRECISE LOCATIONS

How Aluminum Improves



The Allis Chalmers Aluminum-Clad Substation stays new-looking outdoors, resists corrosion from salt air and contaminated atmospheres. Made of interlocking extruded sections, this unit is strong and rigid, requiring little or no maintenance.

REYNOLDS ALUMINUM

Watch Reynolds new TV show "Harrigan & Son", Fridays, starting October 7;
also, "All Star Golf", Saturdays, resuming October 15—ABC-TV.
And on Sunday, October 16, be sure to see the exclusive showing of America's new
1961 cars on The National Automobile Show, direct from Detroit over CBS-TV, 6 to 7 P.M. EDST.

Electrical Equipment and Reduces Costs

• low cost • weather resistance
• workability • high conductivity

Aluminum is finding greater and greater acceptance as a material for electrical equipment in both structural and conductor uses. It is performing these jobs more efficiently, and in many cases, at a much lower total cost than the materials it replaces.

PROTECTS ELECTRICAL EQUIPMENT AND CONDUCTORS

Aluminum equipment panels and structural members resist weathering and corrosion; they never rust; they need no painting or protective coatings. As a result, equipment made with Reynolds Aluminum requires less maintenance and protection.

And panels can be fabricated quickly and economically because aluminum is easy to machine and form. Easy to cut, easy to extrude, easy to bend and shape, aluminum holds production costs to a minimum.

DESIGN FLEXIBILITY WITH ALUMINUM CONDUCTORS

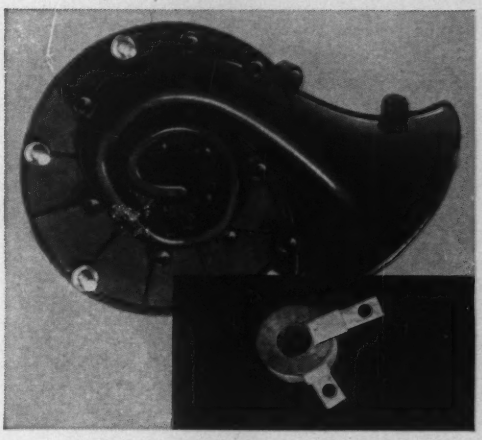
Aluminum strip conductor, a comparatively new development, was pioneered by Reynolds several years ago. Anodized strip is often used in transformers, magnetic clutches and brakes. The anodized film provides the insulation for a completely self-contained and compact circuit. Interleaved foil conductor can replace wire coils, providing equal conductivity at lower cost, higher dielectric strength, fewer "hot spots," and simplified manufacturing. The customer can select his own interleaving material. Reynolds Aluminum strip conductor can simplify product and circuit design, save space and weight.

ALUMINUM BUS CONDUCTOR

Reynolds Aluminum bus bar, available bare or silver plated, offers an important price advantage over comparable conductors. Aluminum bus bars are available in a wide range of shapes and sizes to meet virtually any design requirement. Silver plated bus bar simplifies soldering, and permits higher operating temperatures with bolted joints.

These are just a few examples of how Reynolds Aluminum is used to improve electrical equipment, and to reduce costs.

For technical data and details on the properties of aluminum, call your local Reynolds office, or write *Reynolds Metals Company, P.O. Box 2346-GN, Richmond 18, Virginia.*



Sparton Automotive eliminated eleven parts in automobile horn coils by using Reynolds Aluminum strip conductor. Higher dielectric strength was possible because of the interleaving material that could be used. Turn-to-turn voltage breakdown was reduced. The magnetic lines of flux were more uniform. Heat dissipation was improved, hot spots were eliminated.

S & C Metalclad Switchgear uses Reynolds Aluminum Silver Plated Bus Bar. Space requirements were met with silver plated bus bar, and production was greatly simplified. Easily sawed, punched and formed without peeling or chipping, silver plated bus bar is lower in cost and much lighter in weight than equivalent copper bar. It requires no prior preparation, and meets all electrical code standards.

HANDY & HARMAN SILVER BRAZING
Permits Manufacturer to Guarantee Underwater Air Regulator For Life

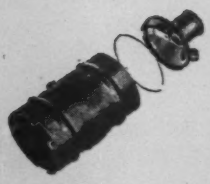
Perhaps, the most vital component of a skin diver's equipment, this Viking Air Regulator, manufactured by Christensen Tool & Engineering Company, Norwalk, Connecticut, is structurally guaranteed for life. It must, under all conditions, be absolutely leaktight. The manufacturer's guarantee is a relatively recent achievement—through the high-strength help of silver alloy brazing with Handy & Harman EASY-FLO 45 and HANDY FLUX.

Over and above the unreserved dependability of brazed joints, the brazing method itself has saved the company considerable time, money and material in the production of the Viking Air Regulator. Brazing's simplicity is interestingly illustrated in this case by this company's requirement that assemblers and testers of the Viking must be skin divers themselves.

Almost invariably, silver brazing effects economies and brings advantages to whatever part, product or assembly it is applied. True, air regulators are few and far between, but the point is that they are *metal products, made of a number of different metal components.*

And that's the phrase that covers brazing's great adaptability. To give you a good idea of how you can put brazing to work, we'd like to send you Bulletin 20—it covers the basics of brazing and it may very easily solve your metal-joining problems. Handy & Harman, 82 Fulton Street, New York 38, N. Y.

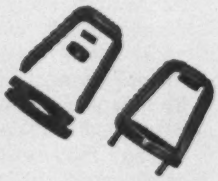
Here, in "serial" form is how the guarantee is "brazed" into the Viking:



1. TANK HOUSING—Initially, this component was mechanically joined and made "airtight" by means of sealants. Now, brazing eliminates 8 holes, 4 tapping operations, 4 screws and 3 assembly operations.

2. FORK ASSEMBLY—There are five separate brazed joints, done with hand torch and hand-fed wire. Brazing eliminates one tapped hole, a lock washer and a spacer, plus the fact that positive alignment is now guaranteed.

5. Shown here are the finished Viking components before and after assembling. —Brazing by Specialty Brazing Laboratories, Riverside, Connecticut.



3. YOKE—This is assembled from stampings instead of castings, which were previously used. With brazing, no secondary finishing operations are required. Further, the part is stronger and lighter, and savings on material and labor on this component alone add up to 28%.

4. PISTON—This is the most important single element of the Viking. It regulates flow of oxygen from cylinder to mouthpiece; from 300 lbs. pressure to normal breathing. Without brazing, this part could not be made.

Your No. 1 Source of Supply and Authority on Brazing Alloys

HH

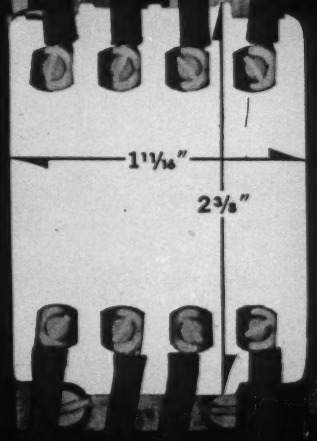
HANDY & HARMAN

General Offices: 82 Fulton St., New York 38, N. Y.

DISTRIBUTORS IN PRINCIPAL CITIES

NEW MACHINE TOOL RELAY

cuts panel space

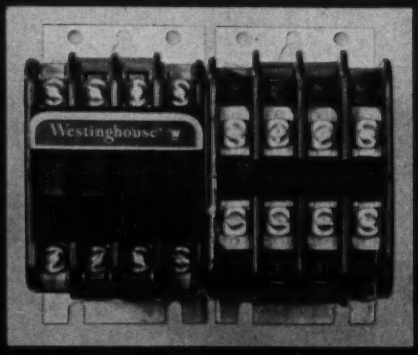


Actual size photo of machine tool panel

new machine tool relay cuts panel space 50%, reduces installed cost over 20%

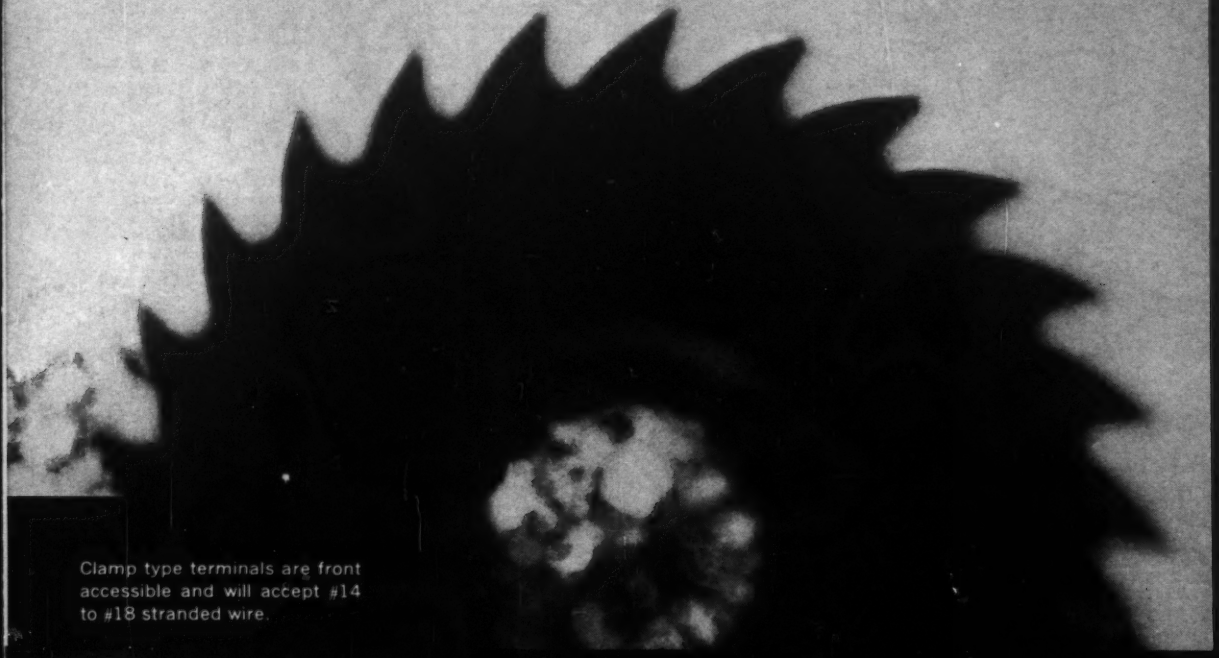
ACTUAL SIZE

Machine tool relay is rated 6 amps, 300 volts a-c, from 2 to 8 poles in 2 basic frames. Relays can be butted against each other to save space.



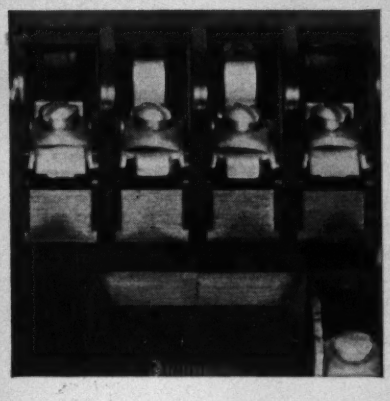
Here's the new Westinghouse relay that cuts the control panel space requirements as much as 50%. Specifically designed for use on automated machine tools, this relay is smaller than any other similar unit available. Relays can be butted against each other in banks. What's more, both 4 and 8 pole frames have the same mounting dimensions, occupy the same panel area, and can be mounted adjacent to each other without additional electrical clearances. ■ Wiring a panel is easier, too. Relay terminals are all readily front accessible. Each of these clamp type connections has a wire stop . . . installation is faster and costs less. You actually save more than 20% over outdated relays. ■ This new relay has load rating of 6 amps, 300 volts a-c—found by experience to be ideal for most of the machine tools now being designed. ■ Want more information? Contact your nearest Westinghouse representative or write: Westinghouse Electric Corporation, Standard Control Division, Beaver, Pa. Remember: You can be sure if it's Westinghouse.

See this relay in action on machine tools at the Production Engineering Show in Chicago—September 6 through 16.

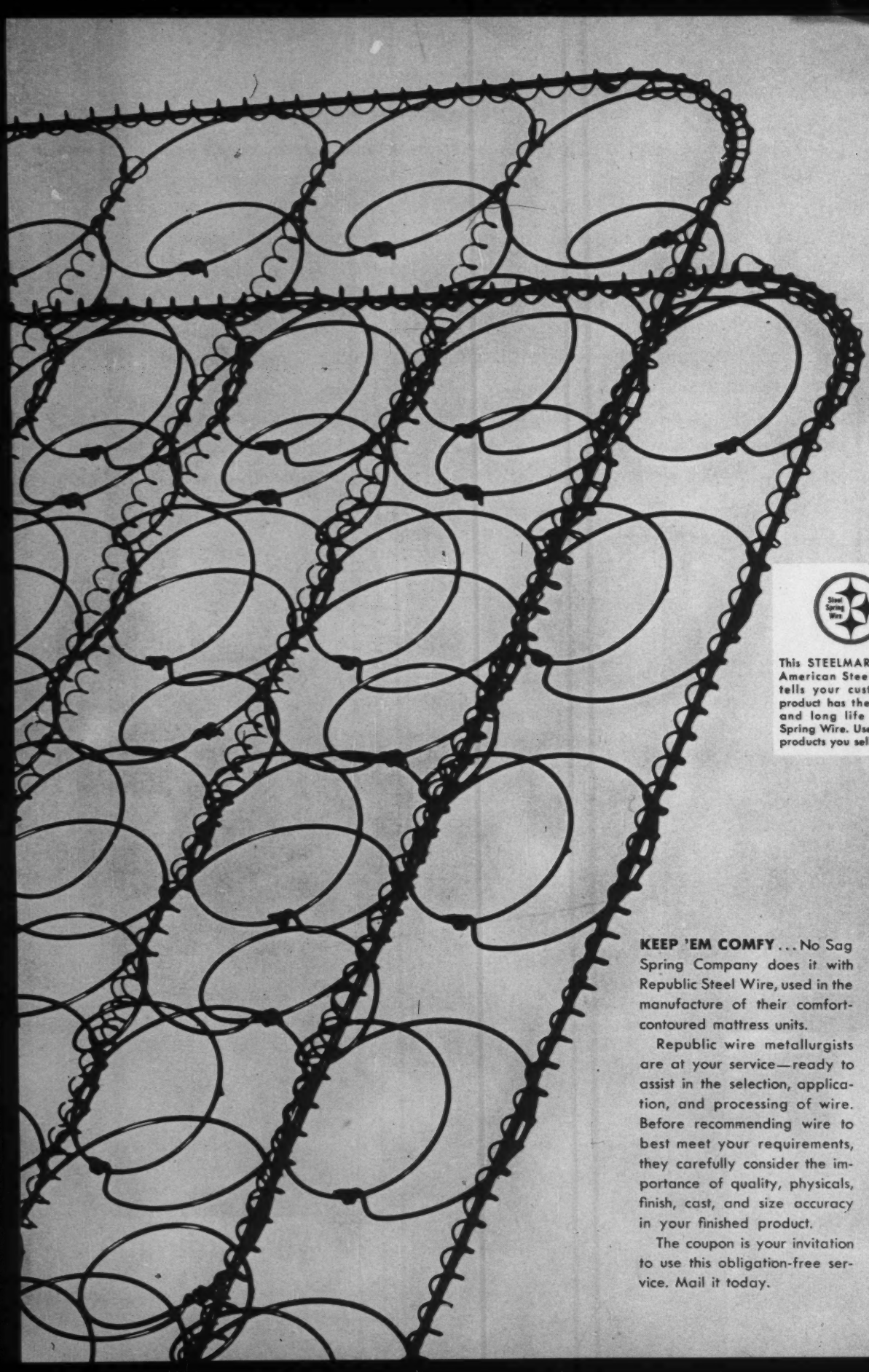


Clamp type terminals are front accessible and will accept #14 to #18 stranded wire.

J-30318



Westinghouse

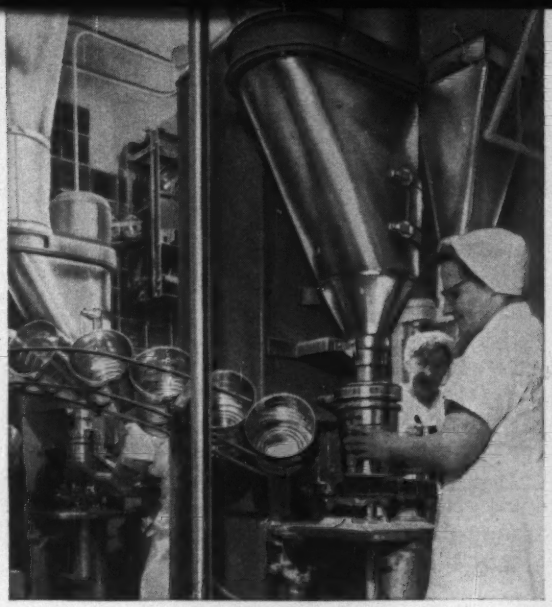


This STEELMARK of the American Steel Industry tells your customers a product has the comfort and long life of Steel Spring Wire. Use it on the products you sell.

KEEP 'EM COMFY... No Sag Spring Company does it with Republic Steel Wire, used in the manufacture of their comfort-contoured mattress units.

Republic wire metallurgists are at your service—ready to assist in the selection, application, and processing of wire. Before recommending wire to best meet your requirements, they carefully consider the importance of quality, physicals, finish, cast, and size accuracy in your finished product.

The coupon is your invitation to use this obligation-free service. Mail it today.



CONVENIENCE, sanitation, and quality protection—yours when you send your product to market in cans made of Republic Tin Plate. Republic Electrolytic Tin Plate is ideal for food, oil, paint, and beverage containers—is made by the cold reduction process which provides all the properties necessary for making tin containers on high-speed automatic machines.

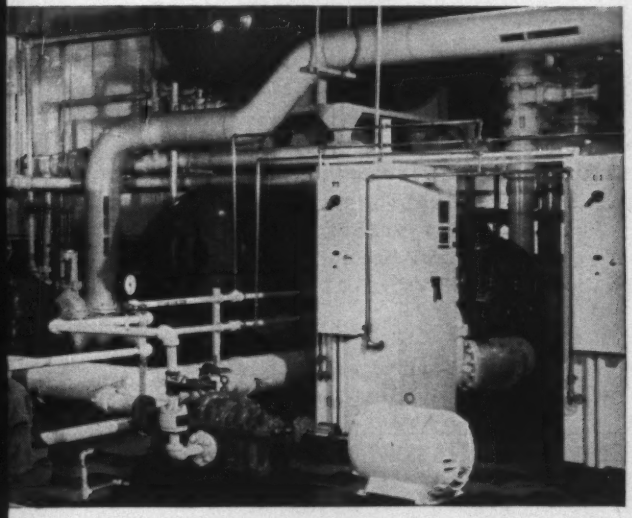
Republic also produces black plate for such applications as lacquered cans and light stampings.

COMFORT, CONVENIENCE, and QUALITY

Are built into products made with Republic Steels

CONSISTENT QUALITY and full-range production experience have made Republic the nation's number one producer of carbon and alloy bars—and leader in the production of special quality steels, such as forging bars.

You benefit from Republic's leadership in many ways. You select from widest selection of shapes and sizes—can call on Republic's famed Metallurgical Service Teams for expert assistance in selection, application, and processing. Republic bar mills are strategically located in major use centers for fast dependable delivery to you.



LONG-LIFE, low-cost Republic Steel Pipe, first choice of operations and maintenance men to handle dozens of tough industrial jobs.

Constant quality control from iron ore to finished product, gives you pipe of outstanding uniformity in quality, size, and strength. The tight, galvanized coating of Republic Steel Pipe stubbornly resists corrosion and fabrication damage. For more information, mail the coupon.

SEE OUR EXHIBIT
Steel Arena
1960 METAL SHOW
PHILADELPHIA
OCT. 17-21
BUILD IT BETTER WITH AMERICA'S STEEL

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. IA-9322-A
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

☐ Have a Wire Metallurgist call.
Send more information on:
☐ Spring Wire ☐ Tin Plate
☐ Steel Pipe ☐ Carbon and Alloy Bars

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Company_____

Address_____

City_____ Zone____ State_____

METALGRAMS

UNION CARBIDE METALS

. . . news of "Electromet" ferroalloys and metals

SEPTEMBER 1960

MORE ELECTROLYTIC MANGANESE -- To meet the increasing demand for "Elmang" electrolytic manganese metal, Union Carbide Metals has expanded its cell capacity by 20 per cent. Hence, a larger supply of this high-purity product (99.9 per cent minimum manganese) is assured for additions to steel, copper, and aluminum. Also of interest: (1) The metal is now available in 50-lb. bags for convenient, accurate additions. (2) The 600-lb. drums of "Elmang" manganese are now color-coded to allow easy identification of the regular, dehydrogenated, and nitrogen-bearing grades. Write for new specification sheet, F-20,151.

* * *

ALLOYS FOR BASIC-OXYGEN STEELMAKING -- Interest has been focused on the basic-oxygen process because it can make high-quality steel rapidly and at low cost. Small accurate alloy additions can be made to the ladle of basic-oxygen heats with bagged alloys. Where large chromium and manganese additions are required, "Chromtemp" ferrochrome and "Mantemp" ferromanganese can be added to the ladle. All these unit-weight packages allow precise analysis control. Also, furnace time is not required to dissolve the alloys in steel. Your UCM representative will be glad to give you further details. Also, write for the article, "O_2 Steelmaking," in the Spring issue of UNION CARBIDE METALS REVIEW.

* * *

SILICON IN COPPER -- First developed in France in 1881, silicon bronze is growing rapidly as a corrosion-resistant material for vessels, tubing, marine and poleline hardware, and electrical conduit. Up to 3 per cent silicon provides strength and hardness. For such additions, Union Carbide Metals offers a low-aluminum silicon metal. Since aluminum makes bronze sluggish in pouring, this special grade contains a maximum of 0.10 per cent aluminum. For further information, contact your UCM representative. Also, write for the article, "Silicon Strengthens Copper," in the Winter 1960 issue of UNION CARBIDE METALS REVIEW.

* * *

SERVICE ON THE MOVE -- Every year, experienced metallurgists of UCM's Metallurgical Service Division travel tens of thousands of miles to customers' plants. Their mission: to provide on-the-site help on the use of ferroalloys and alloying metals in melting. As an example, a Metallurgical Service representative worked with Electric Steel Foundry Company of Portland in evaluating the new fast-dissolving "Simplex" ferrochrome in stainless steel. The joint effort showed that 5- to 7-minute savings in furnace time could be made per 2,000 lb. heat. For a picture story of this cooperative service, write for "Service on the Move" in the Winter 1960 issue of UNION CARBIDE METALS REVIEW.

* * *

HIGHER DUCTILITY WITH CALCIUM-SILICON -- Two Midwestern steel foundries recently obtained data on Grade B steel castings made with and without calcium-silicon. In one test of 91 production heats, all of the heats treated with calcium-silicon and aluminum produced castings with satisfactory ductility. As a comparison, over 25 per cent of the heats deoxidized only with aluminum failed to meet reduction-in-area specifications. In another test of 20 production heats, a 15 to 20 per cent improvement in ductility (% RA) was reported. Further data can be obtained by writing for the article, "Calcium Improves Ductility of Steel Castings," in the Summer 1960 issue of UNION CARBIDE METALS REVIEW.

* * *

UNION CARBIDE METALS COMPANY, Division of Union Carbide Corporation, 270 Park Ave., New York 17, N. Y. In Canada: Union Carbide Canada Ltd., Toronto.

"Chromtemp," "Electromet," "Elmang," "Mantemp," "Simplex," and "Union Carbide" are registered trade marks of Union Carbide Corporation.

NEW CONSTRUCTION RECORDS are being set by the natural gas industry. The industry is currently laying new pipelines and building compressor stations at a rate double that of a year ago. Construction projects involve an additional 11,547 miles of gas pipelines and new compressors having an aggregate of 798,219 horsepower, at a total cost of $1.2 billion.

LEASING FIELD MARKETING MEN can expect questions from prospects prompted by an issue raised in the Pennsylvania RR-union negotiations. The union objects to outside maintenance work done on leased equipment. Freedom from maintenance headaches has been a big selling point in many leasing lines.

MOBILE HOME SALES ROLL ON TO NEW HEIGHTS. Sales of mobile homes have been rising steadily in the past few years. Sales last year of 148,600 units totaled $698,800,000. This is about three times 1949 sales of 46,000 units. Mobile homes are permanent residences for more than 3 million Americans.

SPACE LAUNCHINGS IN FISCAL 1961 will run up a space probe bill of about $600,000, according to Aerospace Industries Assn. estimates. The National Aeronautics and Space Administration will launch 17 earth satellites and four lunar and interplanetary probes in the period.

AUTO PRODUCTION in August headed for the 300,000-unit mark. Roughly one-fourth will be 1961 cars. Inventory of new cars in dealer hands will fall below the million mark for the first time since March. On August 1 and on July 1, they were just under 1.1 million.

THE WELDING MARKET IS HOLDING FIRM as both equipment and supplies show recent sales jumps. Resistance welding equipment sales in July climbed over the $3 million mark, a 47 pct increase over June. The National Welding Supply Association reports that member's sales for the second quarter 1960 increased 5 pct over sales for the same period in 1959.

NET NEW ORDERS FOR INDUSTRIAL HEATING EQUIPMENT of $4 million in July showed a decline of 8 pct compared with June. Sales for the first seven months of 1960 totaled $49,386,000, a drop of 14 pct from $57,186,000 volume for the same period of 1959.

here is a "part-making" *REVOLUTION!*

★75% saving in tool cost

★33⅓% saving in material

★25% production increase

BUMPER
PART SIZE:
106 inches long
4¼ inches wide

MATERIAL:
NAX-TYPE STEEL
Modified For
Bumpers

New, Radial Draw Forming Machines with *HIGH SPEED* production are opening broad horizons in forming metal parts. Greatly increased freedom in part design . . . plus unparalleled production economies are now obtainable with this new process. For the company with vision and foresight to look beyond old fashioned fabrication methods . . . the potential is unlimited.

Parts requiring single or compound curves, constant or varying radii can be formed by The Cyril Bath Special Products Division . . . or we can design and build a machine for you to effect major production economies. Write, wire or phone for literature . . .

THE CYRIL BATH COMPANY

32360 AURORA ROAD • SOLON, OHIO
(LOCATED IN THE GREATER CLEVELAND AREA)
Manufacturers of Radial Draw Formers • Dies • Tools
Press Brakes • Tangent Bending Seamers • Presses • Press
Type Brakes • Special Machines

Licensing Agreements Open Door To Growing Foreign Markets

Licensing U. S. products or processes to foreign manufacturers offers advantages to smaller companies.

Value of U. S. products made under license is 2.5 times U. S. exports.—By J. D. Baxter.

■ As a U. S. manufacturer there are three ways you can tap the foreign market:

1. DIRECT EXPORT — You can export your products directly from the U. S. But here you can run into high tariff walls, labor cost imbalances and local government rules and prejudices.

2. FOREIGN PLANT—You can invest in a foreign operation. Or you can even build your own overseas plant. But this takes a lot of money, more than most small or medium size companies can afford.

3. LICENSING — You can license a foreign manufacturer to make and sell your products, or use your processes. If you have something to offer, and make the right connection, a licensee will pay you good money for the rights. He will make and sell your product and give you a royalty based on sales.

Leap the Wall — By licensing, you can jump over tariff walls, minimize foreign trade red tape, equalize labor costs, and enlarge your market without need of a big investment.

On the surface, licensing sounds like the perfect way to crack open the foreign market for the products of a small or medium company. A number of foreign trade experts estimate the value of U. S. products manufactured abroad by licensees or subsidiaries runs about two-and-one-half times total U. S. exports.

Based on a forecast of the National Foreign Trade Council, total U. S. exports this year should run at about $18.8 billion. This gives an idea of the amount of licensing being carried on by U. S. companies.

Pressures Grow — Some experts predict more use of licensing in the future. The formation of common tariff groups of nations is fast closing the door on direct exports in many cases. Lawrence J. Eckstrom, author of the book, "Licensing in Foreign Operations," states:

"It is conceded that in the next 10 years most U. S. traders will be forced to either manufacture locally or enter into license agreements if they wish to continue present levels of business, or increase their business in these countries."

Mr. Eckstrom cites additional interest among Latin American countries and others in forming economic unions as an additional impetus to licensing.

After a market analysis has determined sales potential in a foreign area, the selection of the export method or technique is made. Under the right conditions direct export is usually the cheapest, most profitable and least red-tape-choked way to sell overseas. If the use of direct export is not practical, then smaller companies should investigate licensing.

Not Easy—"Licensing is not a quick process, and it is usually a costly one," warns T. C. Ballagh, president of Philadelphia's big ex-

When Licensing Overseas—

1. Negotiate your license here, and in English. License contracts are complex enough without introducing language handicaps.

2. Watch your step on territorial limits. U. S. restraint of trade laws are applicable in foreign operations.

3. Keep track of production totals of the licensee. One way: Reserve the right to supply him one or more components. This is important in unit payment plans.

4. Be sure of the protection you have in this country; that it is valid in the foreign country where you are licensing.

5. Try to have your licensee pay for foreign country taxes in your agreement.

6. Include a lump sum payment in your license contract. A per part agreement could return nothing unless the licensee actually makes or sells a certain number of parts.

port management firm, Ballagh & Thrall, Inc.

"To be a successful licensor," says Mr. Ballagh, "you must first have something to sell."

It is possible to successfully license an "unprotected" product or process. But there must still be a reason why a licensee will pay you for the rights to make or use your product or process. He will expect some protection of his rights as received from you.

Protect Yourself—You, also, will need protection. Without protection, contractural or otherwise, you are in danger of starting up a competitor instead of carving out a new market.

You may, for example, have a U. S. patent that protects you in this country but doesn't apply overseas. To get a foreign patent, most countries require application be made within one year after application in the U. S.

Once the patent has been granted in the U. S. it is too late to apply for a foreign patent. You must be sure that U. S. protection is paralleled by a patent in each foreign country where you want to license.

How Big?—You may think you are too small to consider licensing. Here is what one export manager, Rudolf Kuhlmann, has to say on this point: "We feel a manufacturer should see a good possibility for the licensee to do $100,000 worth of business in the second year in order to justify all the work of negotiating a license, assembling the initial technical information, and providing all the other help needed to give the licensee a good start. This is the minimum figure for a small manufacturer."

What are the costs you will incur as a licensor?

One of the first costs will be for patents and trade marks. Patents in most foreign countries cost around $500 to $1000 each to secure, plus annual fees. If you have a series of patents on a number of products considered for licensing then this cost may give you pause at the outset.

Cost Items—Another cost will be for preparation of technical data to be supplied to your licensee. He needs to know everything about your product or process from master blueprint data to detailed shop instructions. Often, this data must be translated or converted from U. S. standards to metric.

Then there are legal and negotiating costs. A company without its own foreign department would be unwise to enter foreign trade negotiations without the services of an export manager or a lawyer specializing in international matters. Their services, while not exorbitant, do not come cheap. And their services are often required for considerable periods.

One big cost is executive time. Top executives are the ones drawn into protracted negotiations and setting up of license agreements. They must make a number of trips to the foreign country, or countries, where agreements are under consideration.

The top executives of a company will also draw into negotiations engineers, production heads and others. Negotiating problems will take these key men from their regular duties for lengthy periods.

Long Negotiations — According to Mr. Ballagh and other foreign trade experts, it takes one to two years to negotiate a license agreement and another one to two years to get into sizable volume.

Says Mr. Ballagh; "A license is like marriage. You are picking a partner for a long time." Most license agreements are set up for a period of five to ten years.

Another cost incurred by a licensor is in training the licensee's personnel. It must be carefully determined which employees—and how many—are to be trained, to what extent and at whose expense.

There will be costs involved in supervision and control of the agreement, and payment of foreign taxes. One plan used by some U. S. licensors to help stabilize the tax picture is to have the licensee pay taxes imposed by his country, and the licensor pay for taxes of his government.

Licensor's Return — What does the licensor get in return for all these costs and expenses? This depends largely on the sales potential of the licensed product or process and the negotiating skill of the parties. to the agreement. Usually,

An Expert Views Licensing

T. C. Ballagh is president of Philadelphia's export management firm, Ballagh & Thrall, Inc. He is a leading authority on export and licensing. Some comments:

"A license is like marriage. You are picking a partner for a long time.

"To be a successful licensor, you must first have something to sell.

"Licensing is not a quick process, and it is usually a costly one.

"It takes one to two years to negotiate a license agreement, and another one to two years to get into sizable volume."

the more a licensee pays the harder he works on selling the item.

Most export managers try to arrange three types of payments for licensor clients. A lump sum initial cash payment, an annual minimum fee, and a royalty based on the invoice value of the product manufactured.

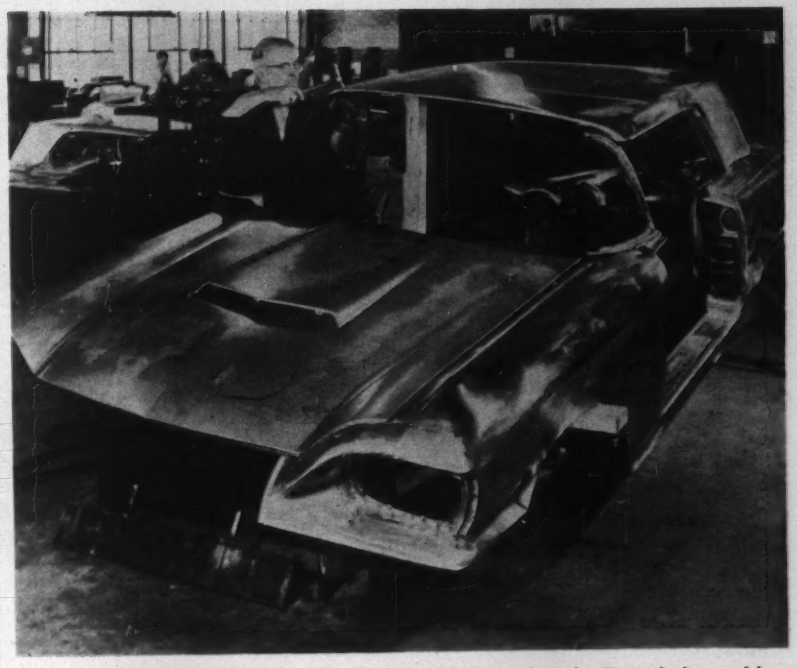
Payment Plans—The initial cash payment is one sure way to pay, or help defray, license expenses in negotiating and getting underway with an agreement. The exact sum depends on a great number of factors—sales potential, negotiating ability, size and resources of the licensee, size of the sales territory, and so on. Average payments can tell little on this score.

The annual minimum fee may run from 50 pct to 75 pct of expected royalty on sales for the second or third year of the license agreement. Or it may start low the first year and increase each year. This payment assures the licensor of some effort on the part of the licensee. The latter must make certain minimum sales at least to meet this payment requirement.

The royalty (license fee) is usually based on a percentage of the invoice value of the product manufactured. In most license agreements this percentage-based payment ranges from 5 pct to 10 pct of invoice values. In cases of high sales volume potential a 2 pct fee may be used. In the case of a high-markup item a figure as high as 30 pct has been used.

Success—There are thousands of successful license agreements in effect. In some cases, foreign markets opened through licensing or other foreign manufacturing arrangements, now produce more sales for U. S. companies than are made in the domestic market.

But seasoned export managers stress two big points: When you go into a licensee agreement make sure you are making a new market, not setting up a competitor. And don't go in without expert help and advice.



DURABLE BIRD: Workman at The Budd Co., plant in Detroit is working on a specially made all-stainless steel bodied Thunderbird.

T-Bird Is Stainless

The most durable car produced in Detroit this year is a stainless steel Thunderbird.

A-L had it made to promote ease of fabrication and durability of the material.

■ How would you like to own an automobile that would last indefinitely? One that wouldn't rust or need painting?

Allegheny Ludlum Steel Corp. has such a car. It's a 1960 Thunderbird with an all-stainless steel body. The company's purpose in having the car made is to "display the long-lasting good looks of stainless steel and the ease of fabrication and joining of this unusually rugged, corrosion resistant and good looking metal."

Production Model — The steel producer has achieved its objectives. The stainless steel came from regular mill production. The Budd Co., which supplies Ford Motor Co. with its Thunderbird bodies, fabricated the special body in its Detroit plant. Parts were made on regular production dies.

More than 1000 dies were used in making more than 300 stainless steel parts used in the vehicle. The body is made of Type 302 stainless steel, trim is made of Type 430 stainless. Stainless steel bumpers, grille and muffler were made especially for the car.

Assembled by Ford — The body was given a special finish, similar to that given stainless steel used in skyscrapers and other architectural applications. However, it hasn't been colored or given any special protective coating.

The auto body was shipped to Ford Motor Co., which then completed the car, adding engine, transmission, suspension, and other mechanical components.

Scrapmen Move to Sidelines

Dealers Try Diversification, Research for Future

More and more scrap dealers are branching out in business out of necessity.

Market uncertainty has prompted product research as well as diversification.—By B. F. Surer.

■ Diversification is becoming the by-word of the scrap industry.

By both necessity and choice, many scrap dealers today are branching into "sidelines." And the outlook is that even more will follow.

The main reason for this diversification is a slackening of domestic scrap demand. Steelmakers have developed methods of using more hot metal; therefore, less scrap.

Total scrap sales in 1959 were 25.7 million tons. At the annual convention of the Institute of Scrap Iron and Steel last January, the scrapmen hoped for sales of some 34 million tons this year. In the first five months total sales were 15.1 million tons. Since then, the market has been dead and that goal is far out of reach.

An Unrosy Period—A spokesman for the Institute tells The IRON AGE, "This is a period that is not particularly rosy. The steel companies have out-researched us."

Few scrapmen are willing to guess the long-range outlook. But most agree that two possibilities loom for dealers: (1) A higher quality of scrap developed through research; (2) Diversification as a means of survival.

Milton K. Mahler, Morrow Steel Co., Detroit, president of the scrap institute, says, "The industry's economic outlook has forced many dealers into other lines." If the market situation continues at the present level, Mr. Mahler believes many yards will merge.

The Natural Step — Diversification is the natural survival step for scrap dealers. Some yards have upwards of $1 million invested in equipment. With scrap demand down, dealers are putting this equipment to profit-making use in other areas.

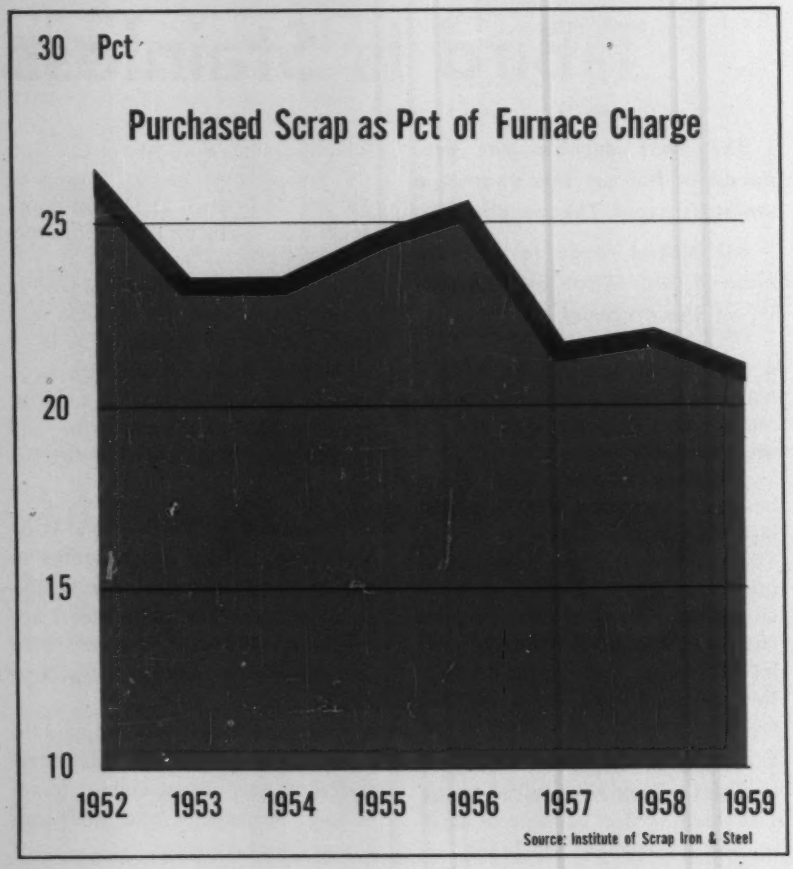
Warehousing of steel has become an active sideline. So have lumber; equipment and pipe selling; marine operations; trucking; plumbing; and industrial consulting.

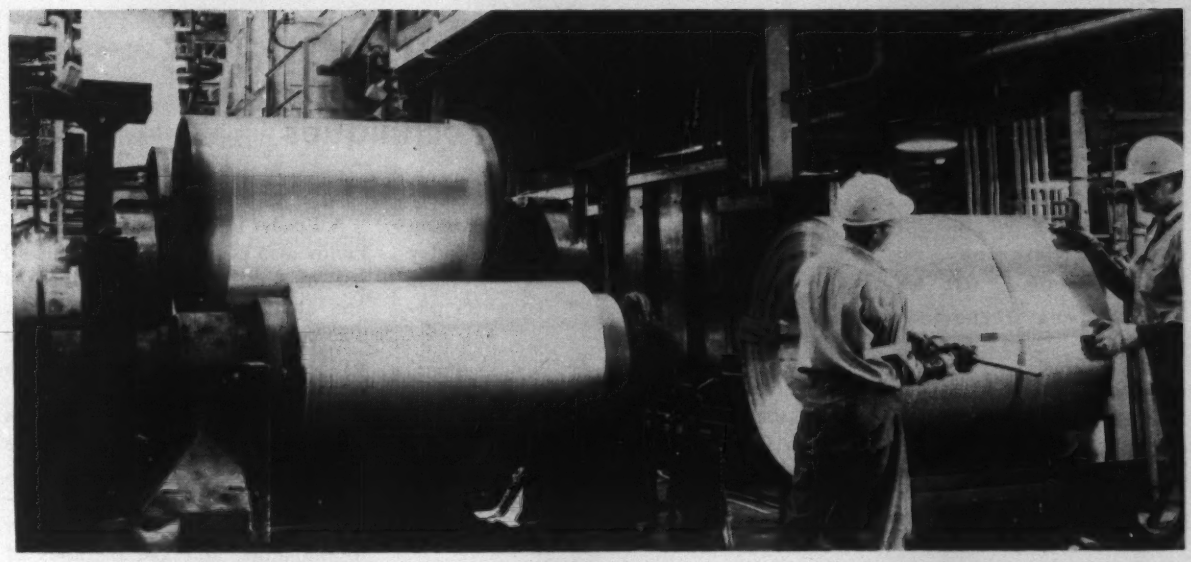
A few scrap operations have even entered into steel production. An example is the Louis Berkman Co., Steubenville, O., which has run four steel mills at different times throughout the past ten years.

Used Machine Sales — Another prospective field is the sale of used machine tools. This diversification by Luria Brothers & Co., Inc., resulted in its Industrial Equipment Div. which now buys and sells used machine tools.

With this practice, yards are kept on a paying basis. Machinery and personnel are ready when, and if, the scrap demand climbs.

Why Scrap Sales Decline





THE BIG TIME: Aluminized steel is now a big item. Here, coils come off line at Armco's Butler plant.

One Switch Tightens a Market

When automakers changed their thinking on mufflers, the market for aluminized steel went out of sight.

One result: Expansion of facilities to handle this and other new markets.

■ A recent change in an automaker's thinking shows how a steel order picture can change over night.

Up to three weeks ago, the three major producers of aluminized steel were making delivery promises of three to four weeks. Then, in just a matter of days, deliveries stretched to two months and longer.

Reason for this sudden surge is the switch by a leading automaker to more aluminized parts in the exhaust system of its 1961 cars. And with the change comes a minor scare buying stampede.

The three producers of aluminized steel are Armco Steel Corp., U. S. Steel Corp., and Republic Steel Corp.

Balanced Concept — Instead of converting entire exhaust systems to aluminized or stainless steel, a balanced concept system is emerging. Costlier heat and corrosion resistant materials are to be used in hotter and more corrosive exhaust areas. But this must be blended with the automakers pocketbook.

In meeting the new demand for aluminized steel, producers are faced with a major problem. Aluminized and galvanized steel use basically the same coating units. And galvanized is also in short supply. Producers, looking at profitability, note that three tons of galvanized can be coated in the same time as one of aluminized.

For this reason, mills shipping aluminized steel to companies experimenting with it attach a cryptic note: "Please do not look on our shipment as assurance of a continuing source of supply."

Need for Expansion — Measures like this point up the need for expansion of aluminizing capacity. And this is already underway. Armco, the pioneer producer, has a capacity of about 425,000 tons. This is being increased with the installation of the industry's largest. fastest, and widest coating unit at its Middletown, O., works. It will handle stock up to 72 in. wide at a rate of 30 tons per hour.

About 85 pct of aluminized steel output is used by automakers, primarily in mufflers. Almost every 1961 car will have some aluminum-coated parts, but Ford Motor Co. is the largest user.

New markets are opening, too. It's now going into hot-air ductwork in power plants, heat exchangers for commercial heating, and combustion chambers for gas heaters.

Trucks and Tractors — Truck builders and farm tractor producers are also using aluminized on a limited scale. Auto mufflers have operating temperatures of 700°, but gasoline engine trucks often double this. Therefore, the heat problem is more severe. And aluminized mufflers have extended muffler life four-fold.

Other uses for aluminized steel are smaller but growing. Even ranges and toasters are beginning to see a use for this steel. In many cases, it replaces painted cold-rolled sheet.

USSR Claims Steel Progress

Russians Boast Lead in Blast Furnace Techniques

This story on Russian steelmaking is based on a report by O. Mikhailov, of the State Science and Technology Committee.

In general, it is believed that the data on actual production, furnace sizes, etc., is reliable, and that net tons are used throughout.—The Editors.

▪ Steelmaking technology in the Soviet Union is making rapid progress, according to reports from the USSR.

In a study of Soviet advances in steelmaking, O. Mikhailov, head of the State Science and Technology Committee of the Council of Ministers, says, "Higher technological standards and improved labor organization have made it possible to increase the output of metallurgical installations."

He lists these gains and forecasts for the Russian metals industry:

In 1913 the USSR produced 60 pct less pig iron than Great Britain and 50 pct less than France. Today the Soviet Union turns out more pig iron than both countries together.

It also leads Europe in steelmaking—producing almost as much steel as the combined output of Great Britain, France, and the Federal Republic of Germany (West Germany).

Within Five Years—By 1965 the pig iron output of the Soviets is expected to reach 65 to 70 million tons. Steel production is scheduled to be 86 to 91 million tons. Rolling mill output is predicted at 65 to 70 million tons.

Investments in building and improving iron and steel plants will total almost $10 billion.

The USSR is currently working on designs of openhearth furnaces with capacities of 600 to 800 tons.

In steelmaking techniques the Reds are giving attention to the use of oxygen, the manufacture and pouring of steel in a vacuum, and continuous steel-pouring.

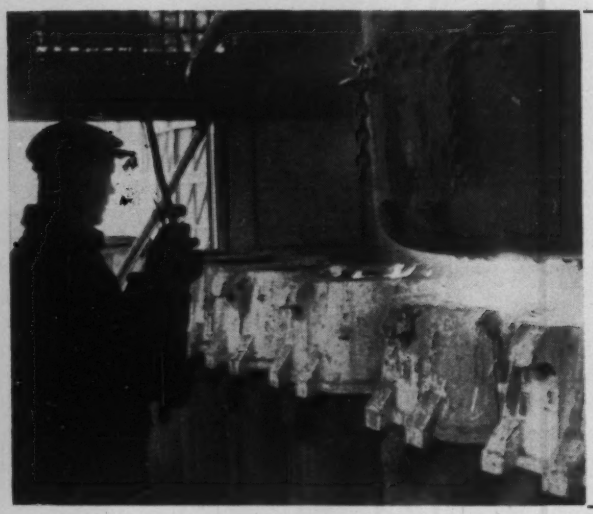
A Leader in Reserves?—Mr. Mikhailov also claims the USSR has 40 pct of the world's iron deposits and almost 90 pct of manganese. The country also claims to lead the world in reserves of copper, lead, nickel, and tungsten.

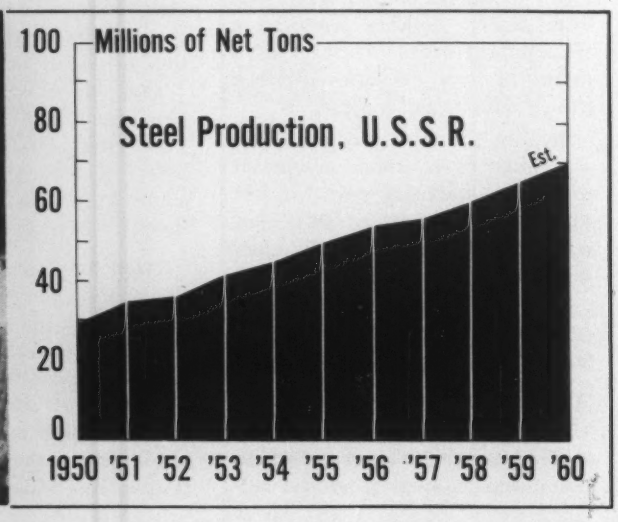
Last year new steel facilities going into operation included three blast furnaces, 10 openhearths, three electric furnaces, two Bessemer (oxygen) converters, seven rolling mills, and five batteries of coke ovens. Also put in use were iron ore mines with a total output of 23 million tons a year.

Soviet Steel Growth—In the report the Soviet expert notes:

"Whereas in 1928 the utilization factor of blast furnace volume was 1.86 (that is one ton of pig iron was produced from every 1.86 cu m of blast furnace volume), in 1959 this factor reached 0.77, a more than two-fold improvement. Similarly, the average daily output of steel per sq m of openhearth furnace floor is 7.86 tons in the USSR."

Technology Helps Boost Red Steel Output





Adds Mr. Mikhailov:

"One of the progressive — from our point of view—tendencies in the development of blast furnace and steel production in the USSR is the further increase in furnace size, which makes it possible not only to produce more metal at lower cost, but also to considerably increase output per worker.

"In the course of the seven-year plan period, the average capacity of new blast furnaces will almost double, that of openhearth furnaces will more than double and that of rolling mills will increase threefold. By 1965 the Soviet Union will have blast furnaces with capacities up to 2,286 cu m (80,000 cu ft).

"Until recently the world's largest openhearth furnace, at Weirton Steel, had a capacity of 550 tons. Now furnaces of equal capacities have gone into operation at the Alchevsky Steel Works of the Lugansk Economic Council. Designs of openhearth furnaces with capacities of 600 to 800 tons are being elaborated in the Soviet Union."

After visiting the Soviet Union, a group of American iron and steel engineers wrote in "Steel in the USSR," that their impression is that openhearth processes in the USSR are better than existing American processes.

Comparing Favorably — IRON AGE Editor George F. Sullivan, one of the delegates who toured the Russian steel mills says: "The actual quotation from 'Steel in the USSR' reads: 'In general, observations of openhearth operations in the plants visited left the delegation with the impression that practices in the Soviet Union compare favorably with efficient American Practices.' "

Discussing technical advances in the USSR's iron and steel industry, Mr. Mikhailov comments:

"We are convinced that an efficient means of intensifying the iron-smelting process in blast furnaces is to increase gas pressure at the furnace throat. The result is greater output of the furnace with less coke expenditure.

SYSTEM FOR SILENCE: Electronic checking system to uniformly calibrate bearing test equipment is discussed by SKF Industries' engineer A. G. Troiani (left) with A. J. Ruffini, the Navy Bureau of Ships. SKF developed system to simplify and improve testing of the equipment.

Quiet Bearings Keep Submarines Silent

U. S. submarines need quiet-running roller bearings to avoid sonar detection.

New electronic checking system, developed by SKF Industries, will improve equipment used to test noise-producing levels of bearings.

▪ Electronics will help make sure U. S. submarines have quiet-running bearings—a must to avoid unfriendly sonar detection.

Researchers at SKF Industries, Inc., Phila., Pa., have come up with an electronic check method for noise measuring devices. The system will be used by SKF to uniformly set test equipment which examines the noise-producing vibration levels on the products of six bearing makers who supply the Navy.

Critical Need—The aim: Helping the Navy get the quietest bearings made in the U. S.

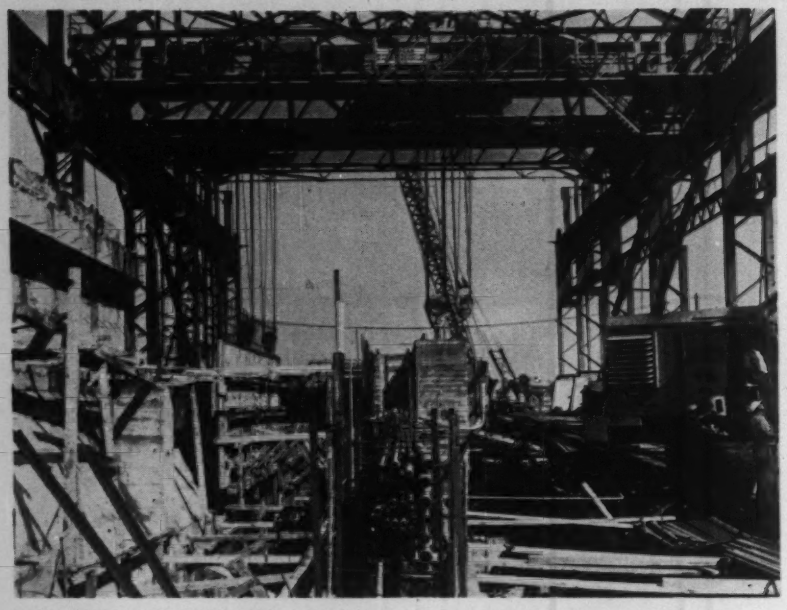
The same calibration system will be established for equipment at the Navy's Engineering Experiment Station, Annapolis, Md.

"Quiet-running rolling bearings — used in many applications on nuclear powered submarines—are a critical need if American submarines are to escape unfriendly sonar detection," says Thomas W. Morrison, SKF director of engineering and research, announcing the contract.

Formerly SKF used a "master" bearing to check the test equipment. The test gear determines bearing vibration in much the same way a phonograph pick-up arm obtains sound from a record's grooves. However, the master bearing was subject to normal wear and deterioration. This sometimes caused unreliable calibration, SKF says.

Now, SKF researchers have developed the electronic check method which eliminates the master bearing. It also sets up a uniform system for electrical and mechanical calibration of test equipment. And it ends the need for lot acceptance testing at a government laboratory.

Work Progresses on New Mill



THE EMERGING SHAPE: Mill buildings at the Great Lakes Steel Corp.'s new 80-in. mill begin to take form. The new mill buildings will cover 880,-176 sq ft. They are located on the Detroit River in River Rouge, Mich.

Check Unemployment Compensation Taxes

Unemployment compensation taxes are an established business expense—and a high one at that. But many companies are paying more than required.

With both Federal and state tax rates hitting new highs, collections will top $2 billion this year for the first time. In fact, industry will pay out about $2.5 billion for unemployment compensation. State tax rates now average an estimated 1.9 pct; a new law raises the Federal rate to 0.3 pct.

A survey of manufacturers in Illinois shows that 6000 over paid their state unemployment compensation tax in the first quarter of 1960 alone. Even large corporations made this mistake. One over paid its tax by $8000.

CF&I to Prospect Iron Ore Deposit

Permit and option negotiations between Colorado Fuel and Iron Corp. and the White Mountain Apache Tribe ended successfully.

The company is granted exclusive prospecting permits and the option to lease Apache land in Arizona. Negotiations were underway for more than two years.

The permit covers 188 sq mi in the northwestern section of the Ft. Apache Indian Reservation. It gives CF&I the right to prospect for all minerals except oil and gas. The permit is for two years with an option for a two-year extension.

Presence of iron ore deposits in the area have been known for many years. CF&I plans to continue prospecting started by the U. S. Bureau of Mines and the U. S. Geological Survey. These earlier efforts indicated reserves of about 10 million tons.

AF-Beryllium Contract

Beryllium Corp., Reading, Pa., received a research and development contract for rolled beryllium structural shapes from the Air Force.

Several other companies will work as sub-contractors on the $300,000 program. Those named by Beryllium are: Allegheny Ludlum Steel Corp., Pittsburgh; The Budd Co., Philadelphia; and Nuclear Metals, Inc., Boston.

The program is aimed at developing or improving techniques for mill rolling and hot extruding of beryllium raw materials more directly into structural components.

UAW: Million Members Get Wage Increase

Wage increases effective Sept. 1 for 1 million UAW members in auto, farm equipment and related industries will cost $120 million over the next 12 months. Most workers will get about 6¢ more per hour but increases range up to 10¢ hourly.

Union says the minimum 6¢-increase will push total value of the annual improvement factor to 64¢ hourly, or $1280 a year. Cumulative value of the improvement factor to each UAW member since first negotiated in 1948, and including next 12 months, is figured to be at least $7920.

Armco Modernizes and Expands at Zanesville

The Zanesville Works of Armco Steel Corp. is undergoing a $2 million expansion and modernization program. Plans call for the expansion of manufacturing facilities, rearrangement of the physical plant and replacement of obsolete equipment.

The major item in the program is a new strip annealing furnace. Five similar units were built at the plant during the past ten years.

Foundation work is started on a building to house a new coil carlite coating machine and a new coil lacquer coating machine. Other new equipment to be installed in the facilities will include a sheet carlite and lacquer coating line and a new 48-in. wide liming machine.

A power substation with a 5000-kva transformer and four unit substations will be added to handle the increased power distribution.

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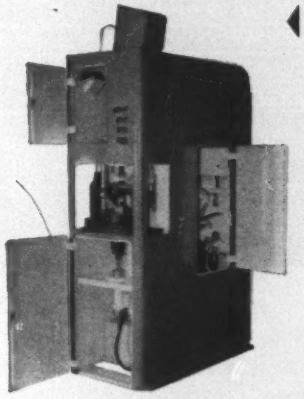
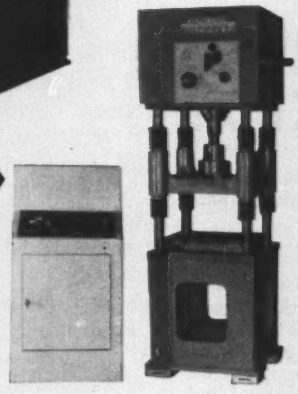
NEW PRESSES



MULTI-COMPACTION PRESS *shown with access doors open. Tooling setup shown is for production of tantalum capacitor anodes. Reel of tantalum wire (seen in upper compartment) is straightened, cut to exact length and fed vertically into the press. Powdered tantalum is automatically fed from overhead hopper into compaction die cavity.*



SERVO-DRIVEN MULTIPRESS "600" *with movable console which contains operating controls. Note rugged platen and large daylight area. Control lever on upper panel adjusts ram stroke for ⅛", ¼", ¾", 1", 1½", 2" and 3" work strokes. Feed mechanism is automatically adjusted when operating speed is varied.*

TWO NEW PRESSES fill the long-standing need for a high speed hydraulic progressive stamping press and a productive, dependable powdered materials compaction press. Here are some of the key features of these advanced new units:

High Speed Servo-driven Multipress "600"

- 600 strokes per minute with 25-ton capacity.
- Strokes per minute and ram pressures are adjustable while press is operating.
- Simple lever adjustment of ram stroke length. Cams can be easily changed for special work strokes.
- Harmonic cam drive automatically sequences the feed mechanism for perfect cycling with ram operation.
- Punch breakthrough is adjustable... does not rely on mechanical stops.
- Press frame and power unit are shock-mounted... resulting in minimum operating noise level.

Multi-Compaction Press

- Designed for volume production of ferrous, non-ferrous and exotic metals... glass and plastics.
- Fully automatic, unattended operation.
- Enclosed tooling area eliminates spillage and loss of material.
- Single or automatic cycle operation... all-hydraulic control.
- Self-contained, overhead stainless steel hopper feed.

Your nearby Denison hydraulic press specialist can show you how the new Multipress "600" and the Multi-Compaction press can help make your products better for less. Call, write or wire for details.

DENISON ENGINEERING DIVISION
American Brake Shoe Company
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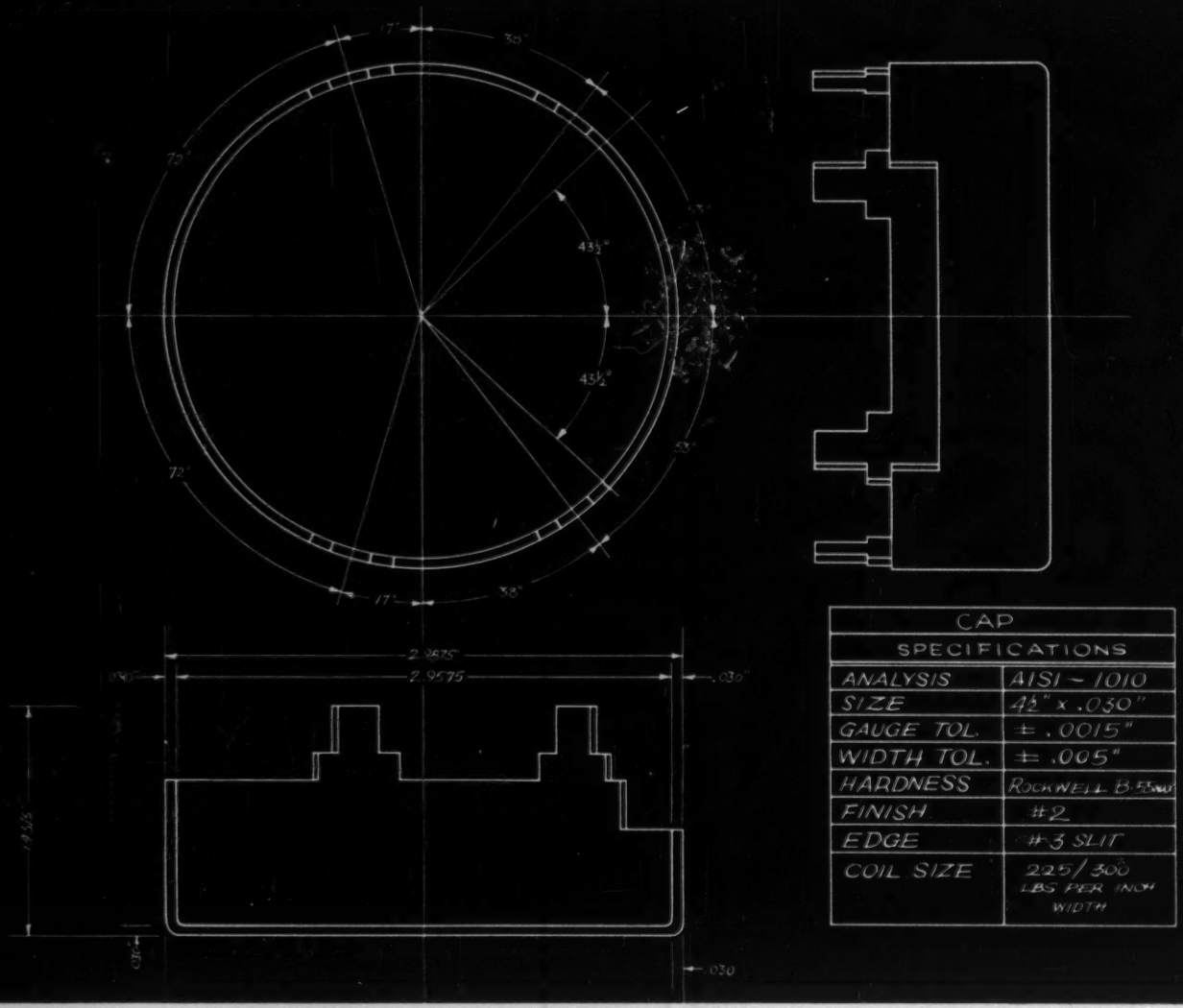
These two new presses will be demonstrated at the Machine Tool Exposition in Chicago, September 6-16.

MMT-PE
1960 Machine Tool Exposition
Denison Booth 914

DENISON
HYDRAULIC MULTIPRESS



CAP SPECIFICATIONS	
ANALYSIS	AISI – 1010
SIZE	4½" x .030"
GAUGE TOL.	± .0015"
WIDTH TOL.	± .005"
HARDNESS	ROCKWELL B 55 MAX
FINISH	#2
EDGE	#3 SLIT
COIL SIZE	225/300 LBS PER INCH WIDTH

HOW CLOSE SHOULD THE TOLERANCES BE HELD?

This part may be produced in a ten-stage, progressive stamping die. It will be made from 0.030" low carbon cold rolled strip steel. The normal gauge tolerance is 0.0015" . . . or, a total variation of 0.003".

Is this tolerance tight enough?

Of course, tolerance should be no tighter than necessary for the successful design of the finished part . . . or for efficient, trouble-free stamping. If the part cannot be fabricated with a minimum of production trouble, the tolerance is *not* tight enough . . . regardless of the design requirements of the finished part. In an intricate, high speed stamping operation, a variation of 0.003" could easily result in a high percentage of rejects; could cause frequent down-time . . . constant tool adjustment; could create *needless* production problems.

Why not check your own stamping operation?

Assured optimum production starts with the design specifications . . . with the specification of J&L Precision cold rolled strip steel. J&L can hold gauge tolerances to tenths of thousandths to provide steel which will perform as your design specifies . . . to deliver the maximum yield per pound of steel.

The experience, facilities and accumulated know-how of a specialized organization . . . directed exclusively to the processing of low carbon, high carbon, alloy, tempered and stainless strip steels . . . are available to work for you. For assistance in solving your problems, call your J&L Stainless and Strip Division representative, or write to Dept. 235Y-616.

J&L STRIP

LOW CARBON • HIGH CARBON • ALLOY • STAINLESS
TEMPERED SPRING STEEL • ZINC AND COPPER COATED

Jones & Laughlin Steel Corporation • STAINLESS and STRIP DIVISION • Youngstown 1, Ohio

Consumer Debt Keeps Climbing

In a year when many business indicators are down or only holding steady, consumer credit is still moving up.

And, if personal income continues high, borrowing should rise with it.

■ It takes a lot to discourage the American consumer.

While many business statistics have been turning downward or holding steady, consumer credit keeps climbing. After a slight dip in the first three months, the amount of outstanding credit rose in April, again in May, and again in June.

Well Above '59—During the second quarter some of the business pessimism seeped down to the consumer's level. But it apparently had little effect on the creating of new debt.

Through June, consumers' short- and medium-term installment debt totaled $41.4 billion, a boost of $5.2 billion over June, 1959. The rise in consumer debt between 1958 and 1959 was over $6 billion.

The debt pattern has also changed. During the big surge of installment growth in 1955, auto financing climbed farther than other debt. But in 1959, the increase in auto paper was less than half that of 1955. Increases in other debt—for consumer goods (excluding autos), repair and modernization, and personal loans—rose faster than in 1955.

How Much Is Enough—As consumer debt mounts, there's always concern about its level. Is the buyer over-committed? How much debt is enough? Doubts about the consumer's debt position are cropping up again.

It's worth noting that since 1957, consumers have been repaying their installment debt at a yearly rate equal to 13 pct of personal income, after taxes.

This 13 pct ratio might be considered a "norm" or debt ceiling—but there's no reason why it should. There's no magic in the 13 pct ratio, says the Federal Reserve Bank of Chicago in analyzing consumer debt.

Sliding Range—The Bank points out the 13 pct repayment-to-income ratio is an average of individual situations. In these, repayments range all the way from zero to much more than 13 pct of disposable income. The national average could climb well beyond that level if more "qualified" borrowers decided to take on debt. It could also fall below the current level if more consumers deferred purchases until they could buy for cash.

Moves With Income—Concludes the Bank: "A decade ago, 10 pct appeared as the likely limit for credit . . . but it was readily breached during 1950's as terms were relaxed, additional lenders were attracted to the field, and credit was offered for a wide variety of new purposes."

. . . As Personal Income Grows

■ Since February personal income (seasonally adjusted annual rate) has been expanding every month, for a total gain of $11.4 billion through the first seven months of 1960. Meanwhile spending for personal use rose $5.5 billion in the second quarter to a seasonally adjusted annual rate of $329 billion (in current dollars).

What They Bought—A large part of the advance went for nondurables, where there was more spending for food and clothing. Spending for services also continued expanding. Outlays for durable goods held about even. Auto purchases moved up, but the contraction in sales of furniture and large household appliances continued.

Breakdown on GNP—This strong rise in demand by consumers helped the Gross National Product reach its new peak annual rate of $505 billion in the second quarter. This compared with a rate of $501 billion in first quarter '60 and $488 billion in the second quarter of 1959.

Other reasons for the second quarter record in GNP: More business investment for plant and equipment, increases in U. S. exports, and more government purchasing, mainly by state and local governments.

Management Research Foundation Started

A new national foundation to conduct and sponsor research in the management field has been set up by the American Management Association. Called the American Foundation for Management Research, Inc., it will headquarter at 1515 Broadway, New York 36.

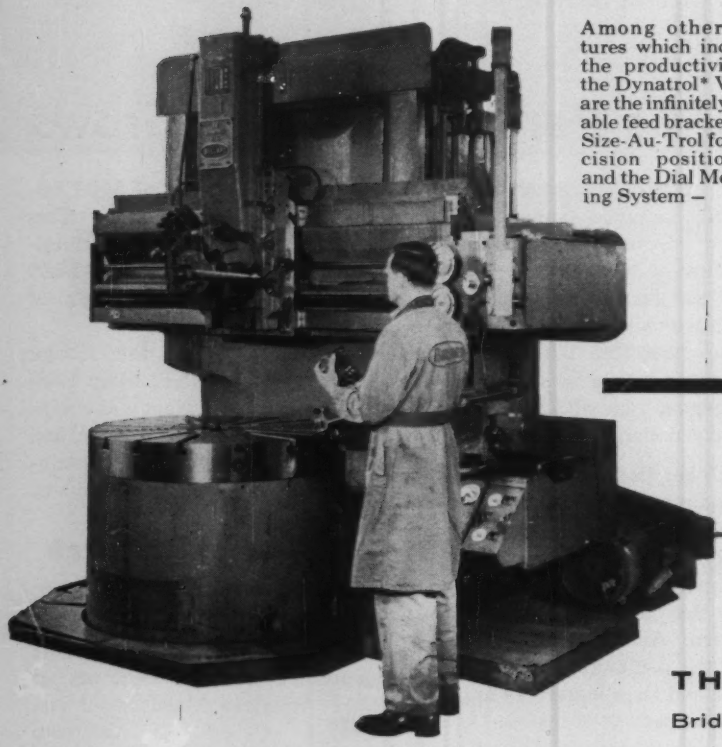
FINGER-TIP CONTROL

Increases Productivity of...

BULLARD

DYNATROL*
VERTICAL TURRET LATHES

Directional control of all head motions in feed on traverse, either horizontally, vertically or at any 45° angle, as well as table start and stop from a lightweight portable pendant, is a distinct production advantage.



Among other features which increase the productivity of the Dynatrol* V.T.L. are the infinitely variable feed bracket with Size-Au-Trol for precision positioning, and the Dial Measuring System –

It allows the operator to always be in the most advantageous position in relation to the work and eliminates the necessity of climbing for buttons or levers. By reducing operator fatigue and increasing his efficiency, more metal is removed per hour with a lower cost per piece.

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ask your Bullard Sales Engineer for the complete Dynatrol story or write for catalog.

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YOU CAN'T BEAT A BULLARD

Compacts Hit Foreign Car Sales

Foreign Car Makers "Americanize" Selling to Fight Back

Volkswagen leads in counter-attack with big press show of new pepped-up models. Sales clinics and dealer bonuses are part of campaign.

Detroit may hit reeling foreign car sales with smaller compacts.—By A. E. Fleming.

■ A dozen 1961 Volkswagens last week darted about a private automobile track near Detroit. Behind the steering wheels of the little cars were automotive writers. From various parts of the country, they gathered in Detroit to see and drive the latest version of the German-made vehicle.

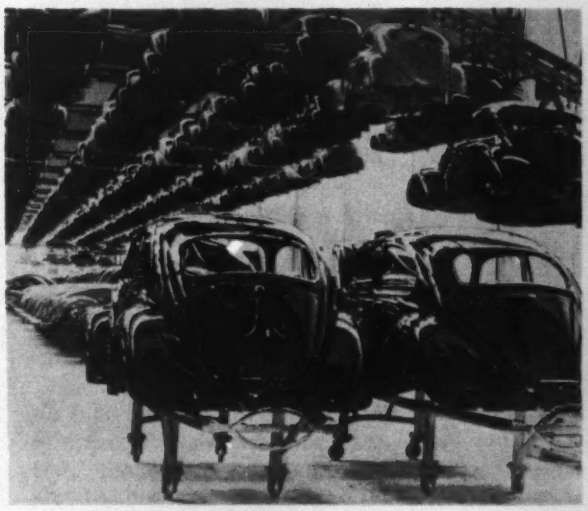
For Volkswagen it was the first national press preview in history. Guided by an American ex-journalist turned publicist, the event came off as smoothly as any that U. S. car makers have been staging for the press each fall.

New Thinking—More than a press preview, though, the Volkswagen gesture—partly because the company is the world's largest car exporter—symbolizes a new and vastly altered way of thinking among foreign car producers. The fresh philosophy: Promote like Americans to win American sales.

This view is a complete turnabout from a year or two ago when competition in the U. S. small car market was less keen; practically every foreign car was bought and paid for even before it left the shores of the homeland. The teaming up of Corvair, Falcon and Valiant with Rambler and Lark, changed all that in the past year. With the once steamrolling foreign car market now sputtering and coughing, overseas manufacturers are "Americanizing" their products and selling strategies.

Car Improvements — Besides press showings like Volkswagen's, they are emphasizing more care for the more than 1.5 million foreign cars now owned by Americans. They are drilling salesmen in training clinics around the country. Equally important, they are pepping up their cars, giving them more horsepower, improved transmissions, increased luggage space. In short, they are going all out to keep from losing all they have gained the past few years in the U. S., the biggest single market in the world for foreign automobiles.

Falling Market — Behind this busy backdrop of promotional activity is a declining market. A great many of the 75 or so foreign makes that are marketed in the U. S. this year are not doing nearly so well as they did last year. In 1960 for the first time since they started their significant upward climb five years ago, foreign car sales in America will not be better than the year earlier. They had spiraled from 58,-



LOOKS THE SAME: The 1961 Volkswagen, produced at Wolfburg, Germany, may appear the same as last year's or even the year before's, but Carl H. Hahn, general manager, Volkswagen of America, Inc., says 27 changes have been made. These include a larger, 40 hp engine and synchronization of all gears.

000 in 1955 to 98,000 in 1956, to 206,000 in 1957, to 378,000 in 1958 and 609,000 in 1959.

Current forecasts indicate a tumble to the 400,000 to 500,000 level this year, a fact accurately predicted by U. S. producers last fall when the Big Three compacts went on display for the first time.

Big Inventories—Adding to the woes of many foreign car distributorships has been a rising number of unsold new models in recent months. The total reached a record 140,000 in early August. In order to help check an increasing inventory, some companies reduced shipments into the U. S. in recent weeks. In attempting to rekindle sales, some foreign car manufacturers are handing out dealer bonuses. Dealer sales contests, unheard of in foreign car showrooms not long ago, are not uncommon today.

In the first six months of 1960, U. S. imports totaled 270,000 for 8 pct of the new car market. This compares to 291,000 and 9.5 pct of sales in the first half of 1959.

Among the top 10 foreign car sellers only four are improving over last year, only one by any great margin. At the half way point, Volkswagen was 22,500 units ahead of a year earlier, Peugeot 1600, Austin-Healy 1000 and Renault 200. Six of the top ten fell below a year ago; Simca by 10,100 units, English Ford 6900, Fiat 6100, Opel 4000, Triumph 2300 and MG 900.

Captive Compacts—Considerably hurt by U. S. compacts are cars produced overseas by subsidiaries of U. S. companies.

Chrysler Corp., in particular, ran into a problem when it gave its French-produced Simca to Dodge dealers to sell. In the first six months of 1959 they did well, selling nearly 19,000 Simcas. But this year they have the low-priced Dart. Simca, shuffled to one side, collected only 8500 sales in the first half of 1960.

Along with Simca the other "captive" imports — General Motor's German Opel and English Vauxhall, Ford's German Taunus and English Ford, Studebaker-Packard's German Mercedes-Benz and American Motor's English Metropolitan—took only 23 pct of foreign car sales in the U. S. in January-June against 30 pct in 1959. Although Mercedes-Benz went up 800 units and Metropolitan 200, the rest went down.

Sales Rebound — Despite this year's faltering effort, those allied to foreign car marketing think the first shock launched by the American compacts will be the worst. They look for sales to rise above 500,000 again in 1961.

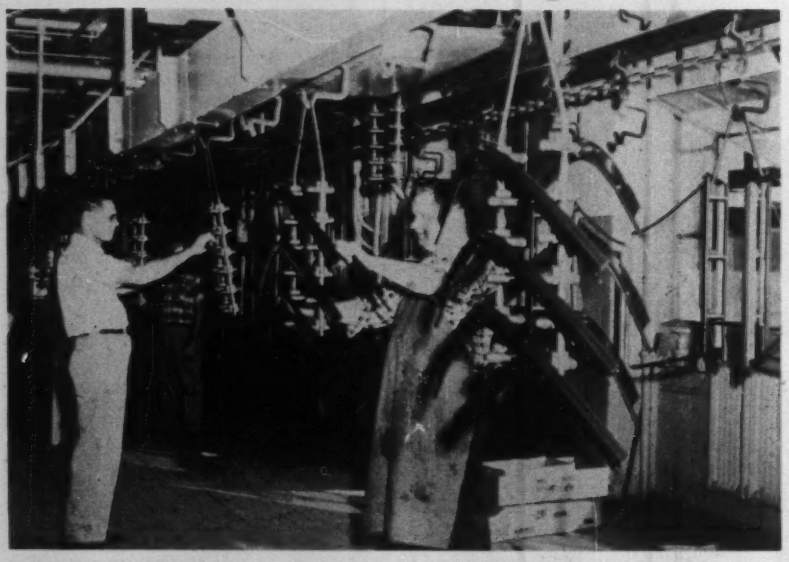
Smaller U. S. Compacts—Now that U. S. car makers have used the compacts to set back foreign cars a step, will they try to finish the job by bringing out smaller compacts to compete with big-volume brands such as Volkswagen and Renault? Ford Motor Co. is working on one. So is Chrysler Corp. And if they are, General Motors is too, although GM keeps denying it.

In speculating on the subject, foreign car officials say they are sure they can turn out a better small car than Americans, since their workers have many years of special experience in making such a product. They also hint they could lower prices if worse came to worse.

Viewing the compact-import subject somewhat philosophically at the press preview at Detroit, C. H. Hahn, Volkswagen of America general manager, said, "The import car success in the U. S. has brought benefits to all of us. The American consumer benefits by lower prices, and foreign countries benefit by earning more dollars to buy such items as American cotton, steel and machine tools, resulting in trade, not aid, for car-building nations."

Volkswagen Sales Up—Although Mr. Hahn says the import market will fall short of 500,000 units this year, he is one who forecasts a return above that level in 1961. Volkswagen, he says, will sell 150,000 units in the U. S. this year. Registrations in the first six months were 77,000, up 41 pct.

Get Off the Hook in Handling Parts



HANGING ON: Dodge literally got off the hook in handling 150 different automotive trim parts by doing away with the hooks. Usually, parts are carried along conveyors on special racks or hung on hooks. However, Dodge has substituted nonelectric magnetic Magna-Rax, developed by Eriez Manufacturing Co., for the conventional method. They consist of double-ended permanent magnets in stainless steel tubes.

Electronics Must Diversify

Less Military Spending Prompts Market Study

With an outlook for a smaller military market facing the electronics industry, plans are under way for marketing changes.

Also, more and better merchandising data must be developed. Some non-military markets are ripe.—By R. R. Kay

■ The electronics industry's marketing men are faced with a major job. They must diversify the industry and tell it how to compete.

The problem, which is under prime consideration, was pointed up again at the recent Western Electric Show and Convention in Los Angeles. The four-day program drew 35,000 persons, mostly managers and engineers, from all parts of the nation.

Chief reason for the need for diversification is a slackening of military contracts. Actually, the military sales picture on the West Coast this year is disappointing. At the convention, this stirred considerable thought.

Where Do We Go? — Industry leaders are spending many hours around the conference table discussing "Where do we go from here."

Right now, the electronics market is approximately 60 pct military and 40 pct industrial-commercial. It may take the industry as long as five years to reach the 50-50 mark. This, however, is its starting point in the move to break from the long dependence on the military dollar.

Management sees two musts for the future: It is vital that additional commercial and industrial uses for electronic products be found. Also, more and better mechandising data must be developed.

The Job of Research—Experts feel the industry won't get far trying to force machine tool customers into huge new investments. Instead, research is undertaken to develop automatic systems for existing equipment.

However, there are still some non-military markets ripe for electronic products. Among these are agriculture and automatic positioning for precision machine tools.

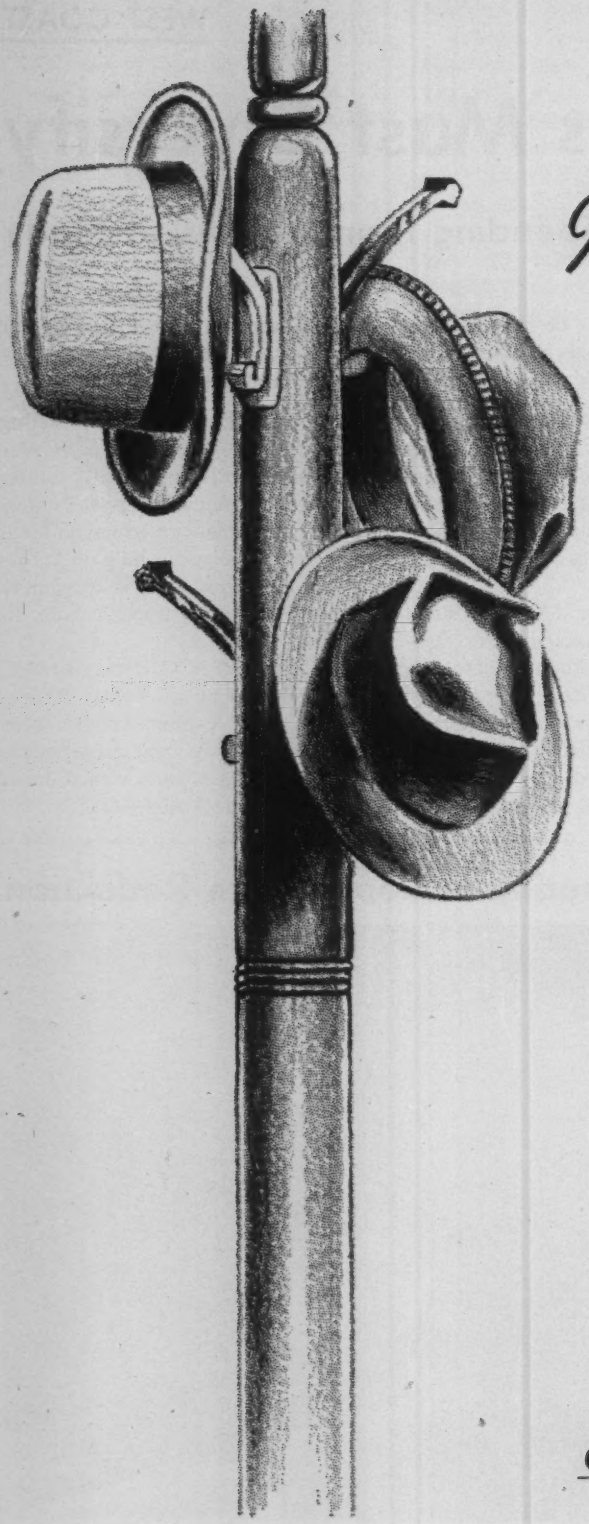
In agriculture, electronic products must be developed for testing the ripeness, sweetness and hardness of fruit. There is also a market for soil testing equipment, irrigation control and product grading.

More Marketing — Marketing men play a bigger role each year in shaping the industry's future. Many electronics companies grew up with a nucleus of technical men. The companies were long on know-how, but short on management skills. Marketing experts help to fill this gap.

At the WESCON presentation in the Los Angeles Sports Arena, nearly 1000 exhibit booths were used to display new equipment. Many companies were turned down because of a lack of space.

Pioneering in Copper Ore Reduction

THE BREAKING POINT: Hard-to-process copper ores are broken down in this rotary calciner. A pioneer in the new copper ore process, the 48-ft long calciner is made of stainless steel. It was designed and built by Standard Steel Corp. of Los Angeles.



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You take a big step in solving machining problems of manufacturing when you call in the Greenlee man. He's used to working with all levels of management, production and engineering. While he doesn't claim to know all the answers, his broad background and experience can be mighty helpful . . . time-wise and cost-wise. Write or call for the rest of the story.

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Will Show Reverse Order Drop?

Even Export Drops in July Machine Tool Orders

July orders hold out only one hope. Are buyers waiting until after the Machine Tool Exposition?

It brought a surge of business in 1955. Show is now 90 pct ready.—By R. H. Eshelman.

■ The wave of export business which gladdened the hearts of U. S. machine tool business this year appears to be receding faster than it rose.

Export orders for the machine tool industry for cutting tools for July were kind of a bombshell. The total plummeted to $10.35 million from a high of $17.15 million in June, according to the July report of the National Machine Tool Builders' Assn.

Domestic Down, Too—Domestic orders also dropped, hitting a new low since November, 1958, at $22.4 million. The domestic and export combined comes to $32.75 million, a new low for the year. It's also well under the 42.6 million reached in June.

Despite the drop in total orders, the export percentage of almost half of the total domestic orders is little short of fantastic. It is a little short of the June ratio of $17 million foreign against $25 million domestic.

Market Indicators—Strong as the foreign surge is, the low domestic-to-foreign ratio is more of an indication of the weakness of the domestic market. Domestic orders started in January this year at $34 million, peaked at $36 million in March, and have slid steadily to the $22 million level in July.

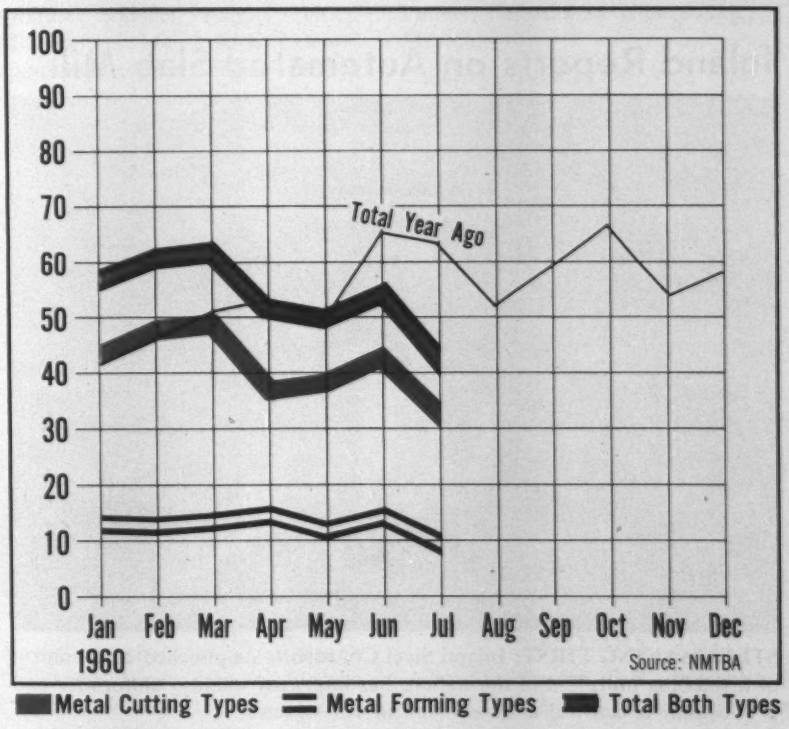
With the decline in new orders, backlogs also dropped slightly—from 4.0 months to 3.9 months. Shipments were off, mostly because of summer vacations. These declined from 48.4 million in June to $39.45 million in July. The major falloff here was in domestic, from $38.0 million to $31 million.

Show Hopes — Referring to the upcoming Machine Tool Exposition, Ludlow E. King, executive vice president, NMTBA, comments, "The machines for the show are about 90 pct in place so far, despite a restricted time to do it. There has been only one cancellation, and that was because the company simply couldn't finish its machine in time for the show."

Builders still hope that users are holding off from ordering until they see the new models at the show later in September. Certainly this unexpected decline makes the show more critically important to exhibitors.

Big Surge in '55—After the 1955 show, there was a big surge of new business. In 1955, fourth quarter net new orders almost doubled to $374 million.

The wave of foreign orders came to U. S. builders mostly as an overflow from Europe. The auto industry there is so hungry for machine tools that builders are booked solid for one to two years.



INDUSTRIAL BRIEFS

Changing Hands—Cowles Chemical Co., Cleveland, has acquired the Promat Div. of Poor & Co., Chicago. Promat manufactures and distributes metal finishing specialty chemicals including electro-plating additives, brighteners, and metal coloring processes. Among the products Cowles manufactures are metal cleaners, zinc phosphate coatings and metal treating chemicals.

Room to Grow—The Clarkson Laboratories, Inc., manufacturers of specialty chemicals, moved to its new plant and administrative offices at 1450 Ferry Ave., Camden, N. J. New facilities will increase the space available for both research and manufacturing. For western customers, the San Francisco plant has just been expanded.

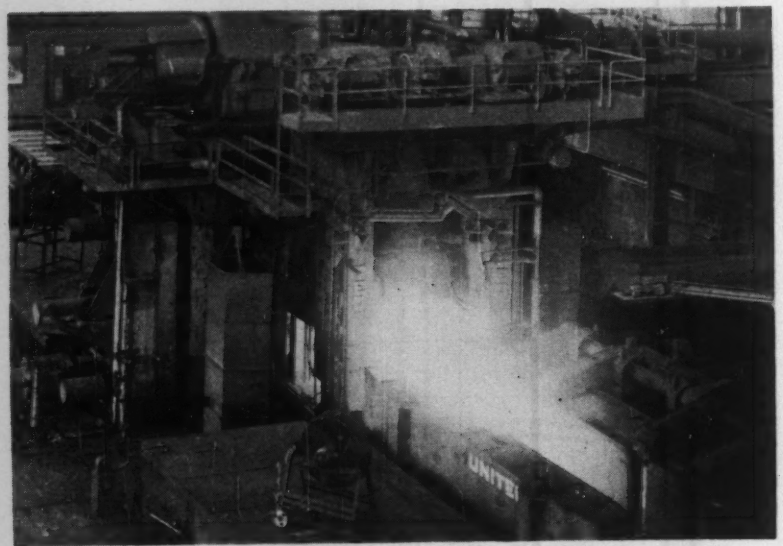
Move to Mountainside—Albert Klingelhofer Machine Tool Corp. has moved from Kenilworth, N. J., to a new and larger plant at 165 Mill Lane, Mountainside, N. J.

South and West—Vulcan Detinning a division of Vulcan Materials Co., is planning to build new plants in Houston and Los Angeles. Both plants are expected to be completed in 1961. The new plants will enable Vulcan to supply markets throughout the Southwest and Pacific Coast areas with electrolytic tin.

For California Markets—American-International Aluminum Corp. opened its new automated and fully-integrated aluminum extrusion plant in San Jose, Calif. The Florida-based company has completed equipment installation in a new 50,000 sq ft plant at 495 Brokaw Rd., San Jose, and is now in full operation.

Branching Out—Branson Instruments, Inc., Stamford, Conn., has acquired Colin Campbell Co., Inc., Danbury, Conn. Branson has also obtained a half-interest in Radionics, Inc., Norristown, Pa. Colin, now a wholly-owned subsidiary, manufacturers transformers, toroids and other electronic devices. Radionics makes gamma radiography thickness gages and flaw detectors.

Inland Reports on Automated Slab Mill



STEELMAKING FIRST: Inland Steel Co. reports its punched card control of a slabbing mill, first in the nation, has improved quality, uniformity and production. It can roll a 20-ton slab in 1.5 minutes.

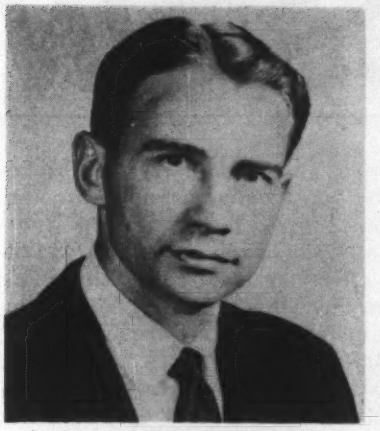
New Jersey Quarters—Electro-Tec Corp. plans to purchase a 10-acre site in West Caldwell, N. J., for a new plant. The proposed facility will house the company's executive, administrative, marketing and fiscal offices, as well as engineering and research/development groups, and a prototype manufacturing department. It will quarter research activities of Preciment Laboratories, Inc., a recently-formed subsidiary.

More Aluminum Colors—To add color in buildings, Aluminum Co. of America developed a new finish for aluminum. The new hue is a pale gold, bringing to 12 the number of color-anodized coatings now available. Other shades include a companion dark gold, two hues of blue, four of gray, two browns, and two greens.

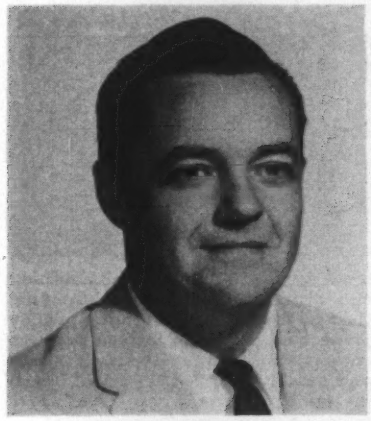
The Full Line — Enthone, Inc. will distribute the full line of precious metal plating products of Technic, Inc., Cranston, R. I. The New Haven-based company is a subsidiary of American Smelting & Refining Co., producer of metal finishing chemicals and electroplating equipment. Addition of the Technic line marks the company's entry into the precious metals plating field.

A New Family — O'Neal Steel Inc., Birmingham, Ala., will market a new family of high strength, heat-treated steels for Great Lakes Steel, Detroit division of National Steel Corp. The company will direct distribution of the new specialty steels in Alabama, Georgia, Mississippi, Tennessee and Florida.

Position Versus Time — A new automatic device for the exact measurement of time intervals in sequential operations of solenoid or relay-actuated components or systems has been introduced by Consolidated Avionics Corp. The unit also provides "position-versus-time" plots for such operations as linear or non-linear valve motion.



John Wandrisco, promoted to vice president, corporate planning, Latrobe Steel Co., Latrobe, Pa.



Dr. R. F. Patrick, appointed research manager, steel refractories, Ceramic Research Div., Corning Glass Works.

S. E. MacArthur, promoted to executive assistant to the president and treasurer, Federal-Mogul-Bower Bearings, Inc., Detroit.

Walworth Co.—**G. A. Hoffman,** appointed vice president, sales.

Pittsburgh Metallurgical Co., Inc. —**J. S. Barker, Jr.,** elected vice president.

Luria Bros. & Co.—**M. N. Thacker,** named asst. vice president, alloys and nonferrous metals.

Kennecott Copper Corp.—**J. R. Simpson,** appointed treasurer.

Coffing Hoist Div., Duff-Norton Co.—**D. J. Wallace,** appointed district sales manager.

The Stanley Works—**G. W. Edwards,** appointed director, finance.

Sandvik Steel, Inc.—**R. F. Nelson,** appointed manager, Steel Dept.

Climax Molybdenum Co., Div. of American Metal Climax, Inc.— **R. R. Freeman,** promoted to civilian markets manager, refractory metals.

The Colorado Fuel & Iron Corp. —**M. A. Kaschak,** named chief product engineer, Palmer Spring Mill, Palmer, Mass.; **R. K. Cramer,** appointed superintendent, Palmer Plant Spring Mill; **Christy Karr,** appointed superintendent, Palmer Industrial Engineering Dept.

M. L. Beck, named manager, manufacturing, High Voltage Switchgear Dept., General Electric Co., Philadelphia.

J. B. Holland, appointed Automotive Division manager, Oakite Products, Inc.

Dravo Corp. — **J. R. Gross,** named manager, Cleveland district sales office.

Struthers Wells Corp. — **A. O. Schaefer,** appointed corporation metallurgist.

Hevi-Duty Electric Co.—**R. M. Palmer,** named field sales manager, Milwaukee.

Farrel - Birmingham Co., Inc., Watson-Stillman Brass Div.—**R. J. Hess,** appointed manager metalworking equipment; **B. D. Ashbaugh,** appointed manager plastics equipment.

Sperry Products Co., Div. of Howe Sound Co.—**P. J. Parker,** appointed general sales manager.

The Youngstown Sheet & Tube Co.—**J. S. Fragomeni,** appointed superintendent, construction, Chicago district.

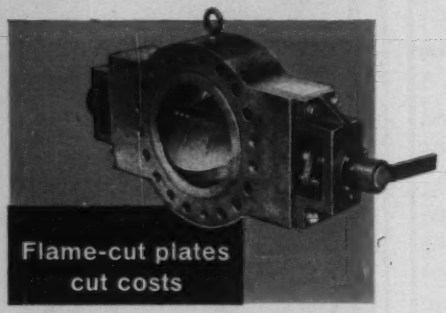
Western Design Div. of U. S. Industries, Inc.—**A. A. Perkins,** appointed controller.

Pittsburgh-Des Moines Steel Co., Midwest Div.—**F. C. Warrington,** appointed manager, steel plate sales.

OBITUARY

S. M. Kaplan, 46, president, M. S. Kaplan Co., Chicago.

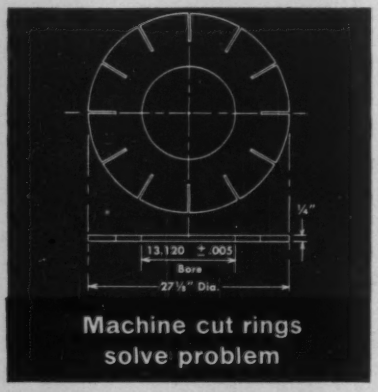
METALOGICS* IN



Flame-cut plates cut costs

HIGH REJECTS: Use of flat steel castings for valve bodies, with I. D. ranging from 4" to 60", accounted for increases in costs for this manufacturer. Pattern costs rose because of numerous changes . . . rejects were high due to porosity and other casting faults that showed up only after machining.

HIGH QUALITY: Ryerson recommended using flame-cut plates ranging in thickness from 1" to 8". Results: greater production flexibility, faster delivery, lower cost and a stronger product for this high-pressure service. Tight Ryerson quality control delivered plates of exceptionally clean surface to exact thickness of finished product, requiring little machining.



Machine cut rings solve problem

PLATES REQUESTED: Ryerson was asked to bid on supplying ¼" Type 410 stainless in 27½" square plates. Material was to be used for orifice plates for 16" burner, subjected to elevated temperatures.

RINGS RECOMMENDED: Going beyond material specs, the Ryerson representative found that the customer intended to cut plate into 27⅛"-diameter rings with 13.120" bore—and then mill 12 slots in outer diameter for expansion relief. Knowing the application, Ryerson recommended supplying machine-cut rings in which slots could then be punched rather than milled. Production savings enabled switching to Type 304 at less cost than Type 410 with slots milled.

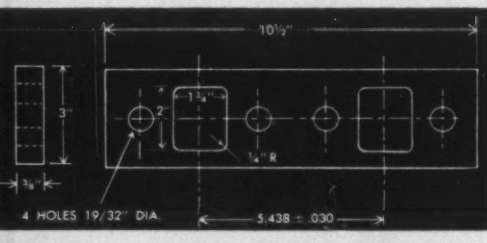
Look at these random examples and see how Ryerson Metalogics sparks real savings by continually searching for and suggesting new materials, methods and techniques.

The broadest experience anywhere combines with the widest range of stocks available to offer you unbiased recommendations on the best material for any job—be it steel, aluminum or plastics. Always the right metal-fabricating machine, too—for Ryerson is the nation's largest distributor.

Your Ryerson representative is "Metalogics-trained" to help you *value-analyze* selection, fabrication and application problems. Get his constructive ideas soon, and see how he can help you select and apply material from our vast stocks. It's the "Metalogical" thing to do.

**The Ryerson science of giving optimum value for every purchasing dollar.*

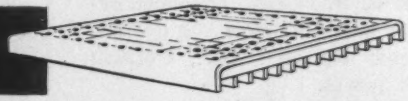
Saved: $100 per thousand



PROBLEM: Muffler manufacturer required accurately finished mounting plates made from ⅜" x 3" bar. Cutting bars to size, burning 1¾" x 2" holes and drilling four 19/32" holes proved time-consuming and expensive.

SOLUTION: Ryerson recommended that they eliminate cutting, burning and drilling operations by stamping the part from Ryerson forming-quality plate. One operation instead of three cut costs $100.00 per thousand pieces and quickly justified the small initial investment in dies.

Suggestion saves 85%



ASKED FOR: Customer wanted 1" hot rolled plate to cover about 80' of 24" open trench. Plate was to be cut into 24" x 27" segments—each containing 900 ⅜" holes to filter the product.

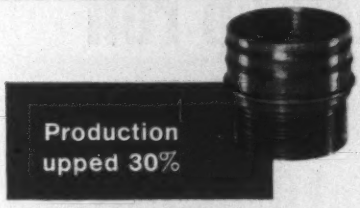
RECOMMENDED: After studying application and cost, Ryerson recommended a design combining perforated light plate, formed to channel shape, and grating for structural support. Ryerson experience and imagination saved 85% of the original cost.

Soft touch on fabricating sheets

THE NEED: Cold rolled sheets that would take severe forming and retain smooth, dull surface for high lacquer finish. Sheet quality was found on inspection to vary widely from one shipment to the next, causing variations in forming and finishing operations . . . high reject rate.

THE ANSWER: The Ryerson representative showed how our stringent quality controls would assure consistent quality on every shipment so that forming and finishing could be standardized for better results . . . lower production cost figures.

ACTION



BEFORE: Job shop was using MT 1015 tubing in the manufacture of this coupling. Machinability was satisfactory, but rising costs of operation led to a search for ways to economize.

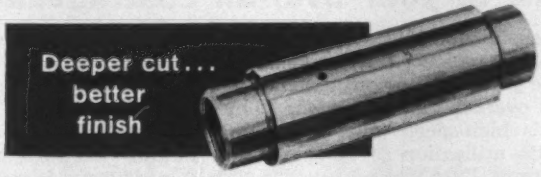
AFTER: Careful study by the Ryerson representative brought about a change in material. He recommended using Ledloy® 170 tubing, which increased machining speed to 170 s.f.m. and stepped up production 30%. Ryerson's stocks include the widest range of fast machining alloys—types and sizes to fit your every need.

OLD WAY: A screw machine shop used nylon in the manufacture of nipple adapter and coupling nuts—until a Ryerson representative came on the scene.

NEW WAY: At his suggestion, they changed to Ryertex-Omicron PVC—cut costs 50%. PVC machined better—to closer tolerances, with improved finish . . . ran faster without "gumming." Note exact cutting of threads and barbs. Threads fit perfectly.

5-DAY LIFE: The sheaves that guide the enormous digging buckets of underwater dredges take a very severe load. Bronze bearing in the sheaves had to be replaced every four or five days.

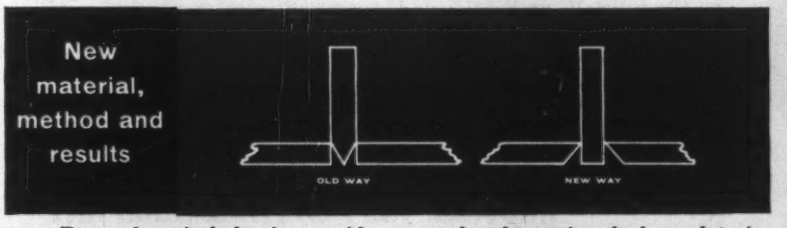
5 MONTHS, SO FAR: After discussing the problem with a Ryerson man, the chief engineer decided to try a bearing made of Ryertex. The change was made, and five months later hardly any wear was noticeable! With its low friction coefficient, Ryertex is nonbinding, even on itself.



SEARCH: Complicated machining of a carbide grade gear shaft included cuts up to ½". It was discovered that required machining was too slow with the steel chosen for the job.
ANSWER: Rycut® 40 was recommended by the Ryerson representative. This free machining alloy fit the situation perfectly. The company found that Rycut 40 machined at 250 s.f.m., gave a better finish, increased tool life, and lowered total per-piece cost. An alloy in the Rycut series may well lower your costs.

2 metalworking machines for the price of 1

A fabricator of stainless steel kitchen equipment was recently in the market for a new squaring shear. The one under consideration had a gap-type frame which would enable him to do an important notching operation—necessary for certain sink tops. After careful study, a Ryerson machinery specialist recommended *two* pieces of equipment instead of one at no increase in total cost. The first, an underdriven shear. The second, a universal-type sheet metalworking machine that would do the required notching, plus many other jobs—adding versatility to the entire operation.



OLD: Rows of vertical aluminum grid members were attached to an aluminum base plate by notching the grid members and welding. (2024-T3 aluminum plate was used.) However, upon cooling, welds fractured—causing a high reject rate on this assembly.
NEW: A Ryerson representative suggested undercutting the base plate (as shown) instead of the grid members. This exposed a greater area to heat and permitted a larger deposit of weld material. Another Ryerson suggestion: change material to 5052-H34 aluminum, which responds better to welding operations.

PRODUCTS IN STOCK

STEEL—carbon, alloy, and stainless steel—bars, structurals, plates, sheets and strip, tubing, etc.

ALUMINUM—sheet (including new building sheet), plate, coils, rod and bar, tubing and pipe, building products, etc.

INDUSTRIAL PLASTICS—Ryertex-Omicron PVC in all forms. Also Ryertex® laminated phenolic plastics for bearings.

METALWORKING MACHINERY—the broadest line available from a single source for every kind of metal fabrication. Also specialized line of material handling equipment.

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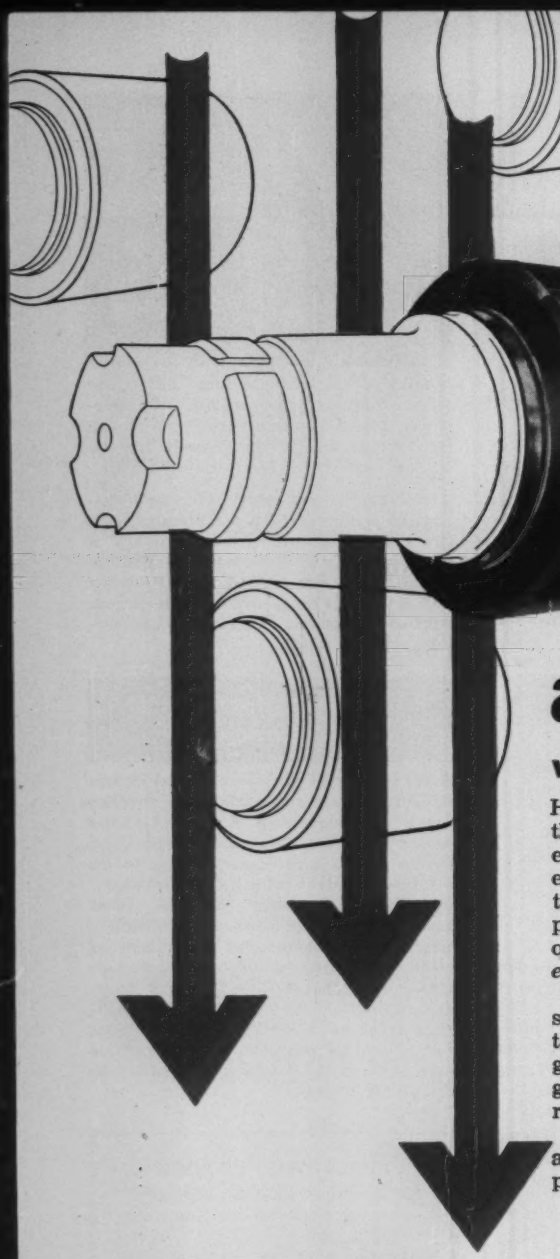

back-up roll SLEEVES custom-built by Heppenstall and Midvale-Heppenstall

work to your over-all cost advantage

Heppenstall and Midvale-Heppenstall Back-Up Roll Sleeves reflect the long experience of two pioneer sleeve producers. These sleeves enable you to roll record tonnages . . . decrease downtime . . . and effect over-all cost reduction. They give longer working life in today's high-speed mills because their up-to-the-minute design permits utilization of more effective forging and heat treating operations. Each sleeve's working surface is *tempered to meet your exact hardness specification.*

These mandrel-forged sleeves — made from highest quality alloy steel — are worked thoroughly under modern hydraulic presses to produce a finished product having both maximum density and grain refinement. In addition, they offer you exactness of fit and greater resistance to cracking and spalling during high-speed rolling.

Heppenstall and Midvale-Heppenstall also produce forged arbors . . . and have facilities to grind both arbors and sleeves for perfect shrink-fitting.

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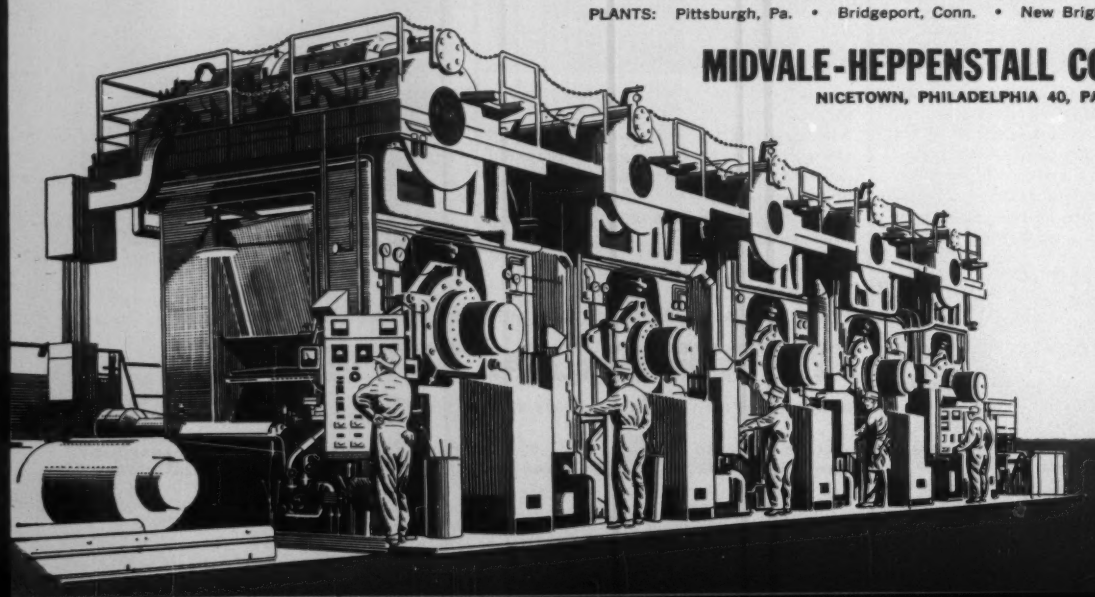
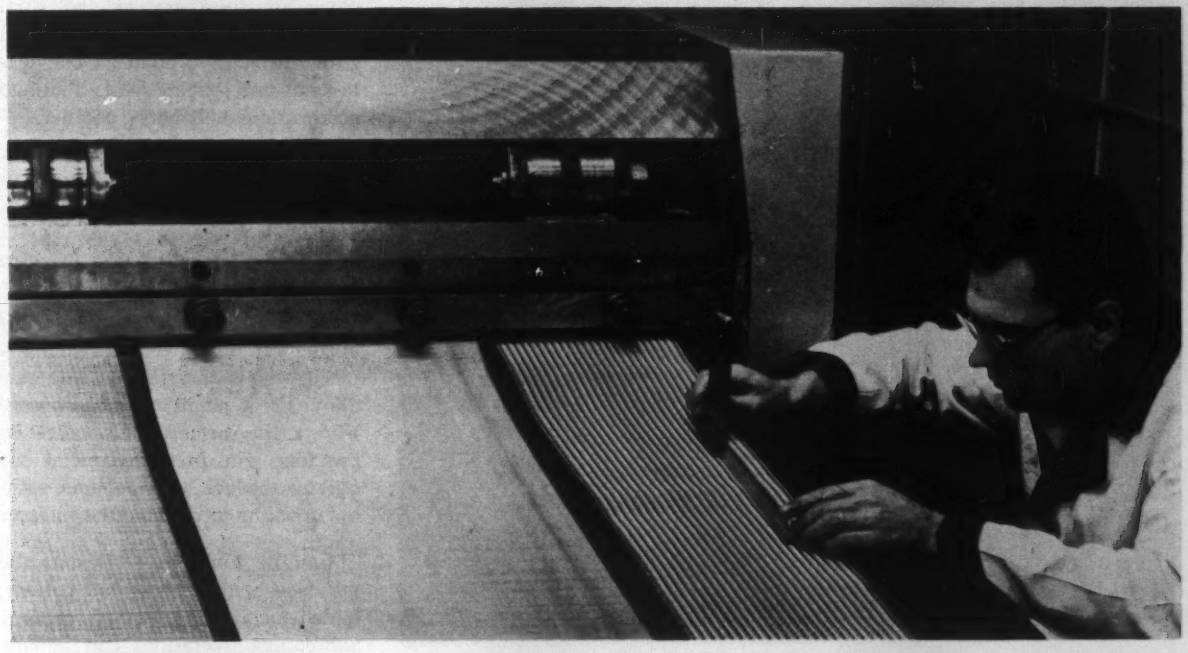




MULTIPLE RUNS: New machine produces lanced, straight, and ruffled corrugations simultaneously.

Folded Metal: New Wrinkle In Fabricated Products

A new metalworking concept calls for folding metal to produce corrugated designs.

The many pattern possibilities suggest new uses for these materials.

■ Here's a new product that's expected to gain interest from the metalworking industry. Called folded metal, it's the result of a new concept for forming metals into corrugated shapes.

Folded metal is like standard corrugated metal. But the new forming technique assures a large variety of patterns that can be tailored to specific jobs. So reports the New Products Development Dep't., Twin Coach Co., Buffalo, developers of the new corrugating process.

Twin Coach is presently a leading supplier to the aircraft, missile, and vehicular fields. It specializes in the design, development and production of light-weight ferrous and nonferrous metal structures.

May Gain Appeal—This development opens up a new realm of possibilities for users of corrugated metals. Other manufacturers may find that they too can make use of these intricately formed materials.

To demonstrate the versatility of the process, Twin Coach will install corrugated office partitions in its new data processing building. Three different configurations will be used.

The immediate interest will probably be in those industries dealing with decorating, packaging, appliances, and heat transfer and electronic equipment. Examples include curtain walls, containers, space heaters, air conditioners, heat evacuators, and wave guides.

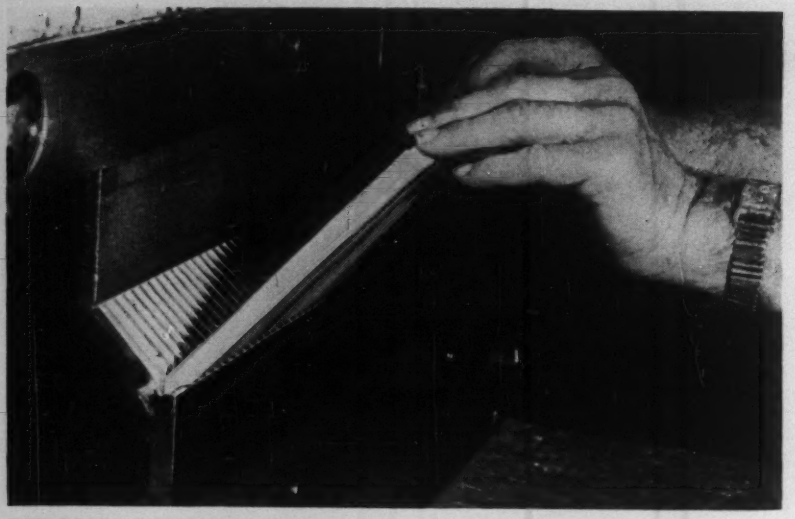
Moves in Both Planes — The process is not a drawing or stretching operation. As the name implies, the metal is folded. Key to the technique is a cam-controlled action in the machine which moves the forming dies in both vertical and horizontal planes.

Thus, the process permits simultaneous offsetting, perforating, slotting, or lancing. An unlimited variety of patterns is possible.

Numerous variations in materials, gauges, and dimensions may also be obtained. This is due to an unusual feature of the machine

which allows it to make corrugations of varying depths without changing either cams or dies. Instead, it's the vertical action of the machine that allows corrugation depth to be adjusted.

Controls Spacing — The spacing of the corrugation is controlled by the horizontal action of the machine or thickness of the dies. It is possible to vary the horizontal stroke to achieve adjacent corrugations of one spacing while alternate corrugations will be of another.



THICK MATERIAL, ALSO: Despite height of corrugations, folded metal readily takes to forming on a standard press brake.

CHECKS PEEL STRENGTH: Technician conducts tests on bonded sandwich with corrugated core. Sandwich can be used for doors and partitions.

The new corrugating machine forms most structural metals whether they be aluminum, brass, copper, stainless or regular steels. In addition to metals, the machine can corrugate plastic and cardboard.

Suppose the metal is painted or coated. It might be aluminum—faced with a brazing or soldering alloy. Or it might be brass—faced with a tin surface. This poses no problem. The precoated metal can be run through the machine without cracking or marring the surface.

Can Be Formed — Despite the intricacy of the corrugated pattern, folded metal takes further forming. Subsequent operations can include stretching, shearing, embossing or bending to boost design freedom. Shearing, for example, gives a crimp seal to the metal.

There are a number of applications where there's great potential for folded metals. One example is as a filler in lightweight bonded sandwiches where the strength to weight ratio is not of primary importance. Consider these applications.

The bonded sandwiches might serve as lightweight partitions. The corrugated core would permit transfer of a heat medium. It would also make an effective radiant heating and cooling panel.

Features Flexibility — Another use for corrugated metal is on the side of a panel to improve its decorative value. At the same time, it would be flexible enough to change directions without splicing.

How about using folded metal for lightweight buildings? Lightweight fireproof doors and furnishings are other possibilities. Bonded sandwiches could be used to make overhead doors that have no open joints. Ducting to carry high-velocity air is still another prospect.

You name it. The possibilities are endless.

Acceptance for these uses would, of course, depend on a fabricating technique that would make them competitive in price.

Short Setup Time — Corrugated materials can be made at the rate of 2-9 fpm. (The actual figure depends upon the spacing of the fins.) This speed is probably slower than corrugating by standard techniques. However, Twin Coach points to the relatively low cost of the new equipment and the short setup time required to make a run.

The new machine operates on a self-feeding principle. It uses coil stock which feeds continuously into the unit. Hence, cost of labor to load stock and operate the equipment is a minimum.

There are other cost advantages for the folding machine. Dies are not expensive. Costs range from $800 for the simplest design to $3600 for the most complex. Moreover, die life averages 1000 hours before the need for replacement.

No Accuracy Problems — What about accuracy? Does the new machine sacrifice dimensional control for speed? At present, folded metal is available in gauges ranging from 0.002-0.030 in. Tolerance is ±0.001 in. The maximum gage and accuracy are governed by the hardness of the material and its work-hardening traits. But, for most jobs, accuracy will not be a major problem.

The machine now in use at Twin Coach takes stock in any width up to 36 in. But this is not the limit. If desired, a unit to take much wider stock could be built easily. Another point: the 36-in. width machine is not restricted to forming material of this size. It can handle, for example, several rolls of varying widths and patterns simultaneously.

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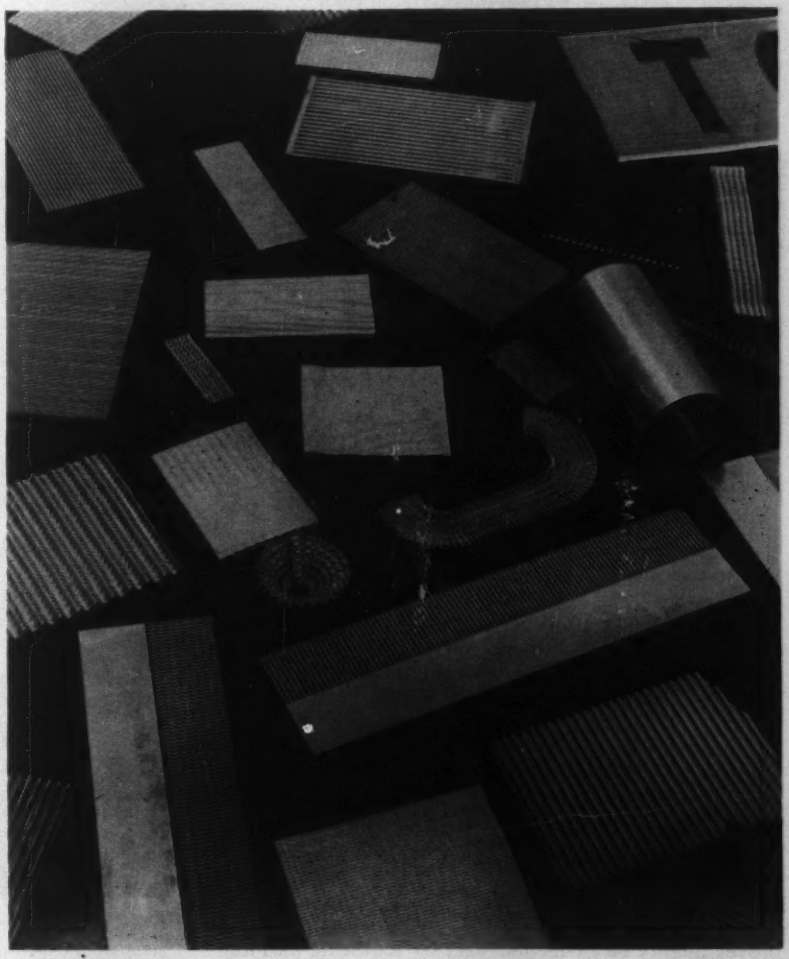
EMBOSSES METAL: Ruffled corrugated stock takes embossing on standard press. Folded metal can also be sheared, rolled, and stretched into many shapes and patterns, offering greater freedom of design.



FEATURES WIDE VARIETY: Many variations in patterns, materials, gages, and dimensions point up diversity of design concepts possible.

Giant Furnace To Meet Demands For Vacuum Melted Steels

The quest for higher purity alloys is never ending.

One plant is meeting the challenge by completely revamping its steelmaking facilities.

■ Slated to go into production late this year is a giant-size consumable-electrode vacuum melting furnace. Capable of turning out steel ingots of 5 ft diam., it may well be the largest furnace of its type in the world. Cost: about $1,000,000.

This move by Midvale-Heppenstall Co. points up a growing trend towards use of vacuum-melted steels. Just a few years ago, two new consumable-electrode furnaces were put into production at the Philadelphia plant. But the largest ingot it produces is only 21 in. diam.

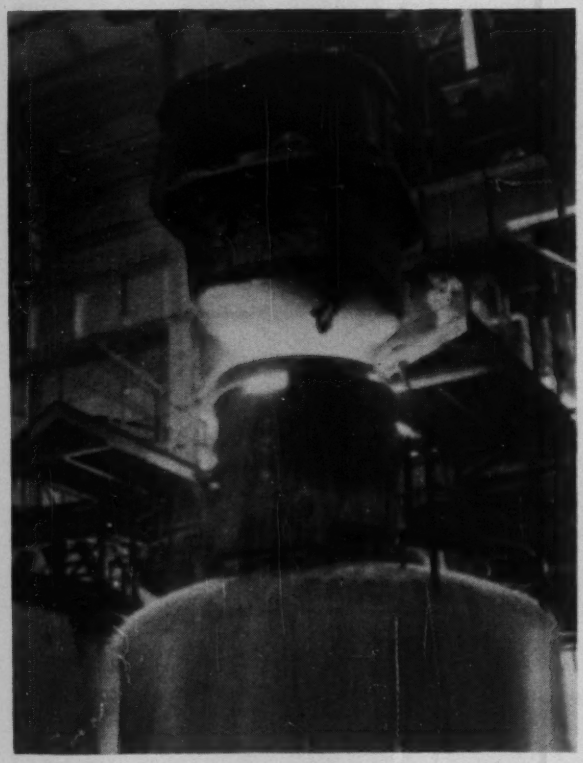
For Mills and Forgers — The projected annual capacity of the new furnace is 8000 tons. A portion of the output will be sold in the form of semi-finished slabs and billets to rolling mills and to the manufacturers of closed-die forgings for aircraft and missiles.

Midvale-Heppenstall believes that non-military demands for vacuum-melted steels will increase rapidly. Thus, most of the output is expected to be used in the company's own plant and in the plants of the parent company.

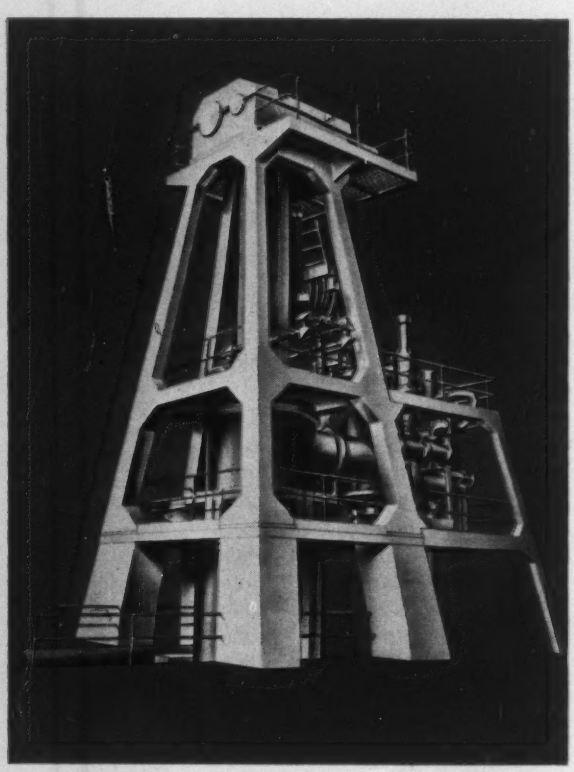
The company's regular products that require steel of this quality include: hardened and ground forged-steel rolls, turbine and generator shafting, gears, and various high stressed forgings.

Some of the high-temperature alloys to be melted include: A-286, INCO 901, PWA 1002, Discaloy, Ladish D6AC and Jessop H-53.

Dimensions Are Large — The overall height of the new furnace, to be installed by Consolidated Vac-



DEGASSES STEEL: Vacuum stream degassing improves quality of air-melted steel by removing harmful gases. However, vacuum melting by consumable-electrode method gives an even cleaner steel.



INGOT SIZE TO GO UP: The new 40-ft tall furnace, soon to be installed, will turn out ingots of 5 ft diam. Present consumable-electrode vacuum-melting furnaces produce ingots up to 21 in. diam.

uum Corp., Rochester, N. Y., will be 40 ft from the floor. It will be mounted on a base plate measuring 13 x 13 ft. The water jacket and crucible assembly will be in a pit 31 ft deep x 27 ft long.

Crucible size can go as large as 60 in. diam. However, the first ingots to be produced will be 40 in. diam x 14 ft long. Weight: 25 tons. Ingots as small as 32 in. diam x 12 ft long, and weighing about 11 tons, will also be made.

Modernize the Plant — Installation of the new furnace is just another step in the vast modernization program underway at Midvale-Heppenstall. In the last five years, eight million dollars have been spent.

Not a step was missed in the melting procedure, or the equipment that would affect steel quality.

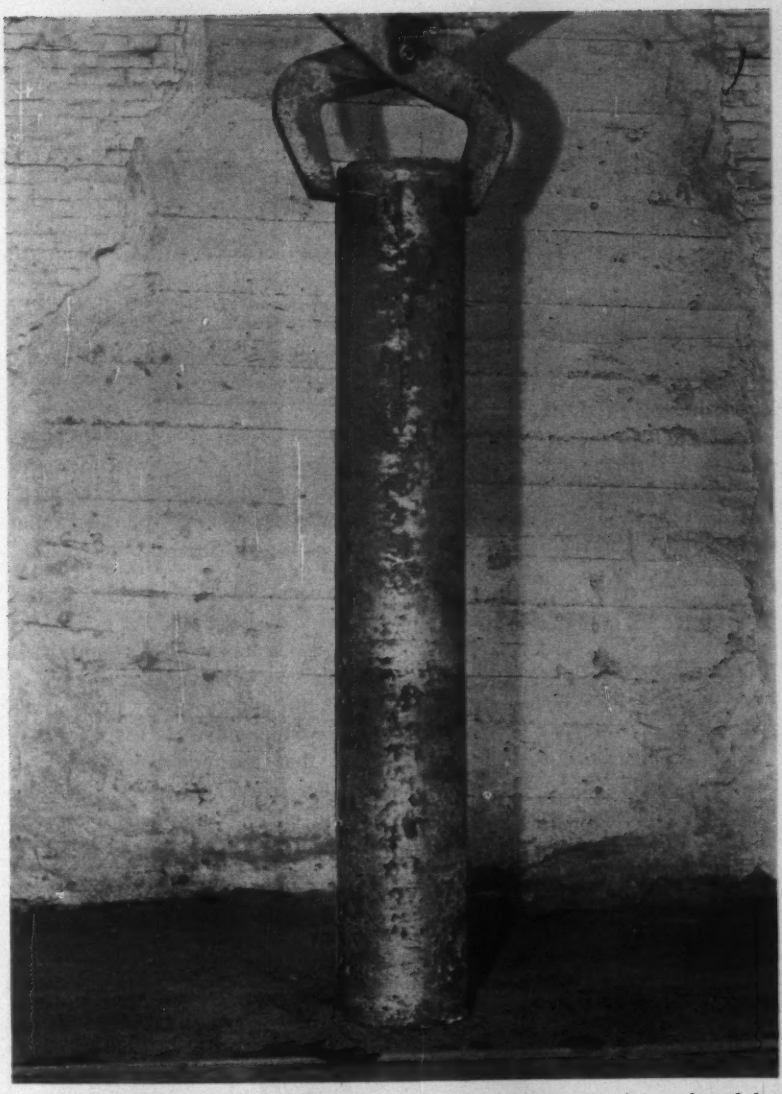
The acid openhearth furnaces, long a landmark at the Philadelphia site, were removed. The two-level system of melting and pouring was eliminated and the entire melting operation placed on one floor. This was achieved by excavating the floor and digging deep pits.

To Cast Ingots—Three new electric arc-type furnaces were installed: 100-ton capacity, 50-ton capacity, and 30-ton capacity. Part of the output will be used to produce electrodes for the vacuum-melting furnaces.

Because the plant is located near a residential zone, a dust control system was installed as auxiliary equipment.

To insure that better scrap be used in these furnaces, the scrap storage was moved from outside—exposed to the weather—to modern storage bins under cover and adjacent to the melting floor.

Removes Harmful Gases — To further improve the quality of the air-melted steels, a vacuum-stream degassing system, built by F. J. Stokes Corp., Philadelphia, was installed. This system removes deleterious gases such as hydrogen, oxygen, and nitrogen.



HIGH-PURITY INGOT: Typical ingot of high-purity steel, produced by consumable-electrode furnace, is 20 in. diam. Weight: 9000 lb.

At first, this system was designed to degas the ingot after it had been poured from the ladle. However, to permit degassing of smaller ingots, plant engineers devised a method of ladle to ladle degassing. Then the ingots are poured after the metal has been degassed. This increases the capacity of the degassing and speeds up production.

Other plant improvements include: new ladle cars, an improved handling system, and better temperature controls.

Properties Are High—These new consumable-electrode vacuum-melting furnaces provide steels of top physical properties. A high degree of cleanliness is achieved through the removal of non-metallic inclusions and excess gases. Better chemical and mechanical properties result due to freedom from segregation. The steels show improved workability and ingot soundness.

This is another case in the steel industry where modernization and improvement of equipment are making available finer steels to produce better finished products.

Developments Extend Market For Stainless Powders

By W. L. Batten—Manager, Powder Metallurgy Dept., Vanadium-Alloys Steel Co., Latrobe, Pa.

Stainless-steel powders are becoming more and more useful. Their heat resistance serves a variety of industrial needs.

Adding a lubricant to these powders improves mechanical properties for structural use.

■ Stainless-steel powders have a reputation for being exotic materials. Until now it has been hard to process these powders into useful shapes.

Most problems occur in sintering. Stainless steel can be sintered in low dew-point inert gases or in a vacuum. However, the most practical atmospheres—from a cost and control viewpoint—are dissociated ammonia and pure, dry hydrogen.

Various dew points are often recommended, but —40°F is the highest dew point that permits rapid and thorough sintering.

Detect Unstable Oxides — The chart shows equilibrium conditions between certain metals and their oxides in hydrogen atmospheres of different dew points at various temperatures. Curves for metal oxides that are commonly used in powder form are very unstable. These curves would lie to the left of the FeO curve. Among the metals commonly used in powder form are iron, copper, nickel and lead.

Curves for the stable oxides of calcium and beryllium would lie to the right of the Al_2O_3 curve. Such curves depict impossible-sintering conditions for most metal-powder fabricators.

Here's the meaning of the curves. Conditions to the right and below will cause reduction of the oxide. Conditions to the left and above oxidize the metal.

All curves represent equilibrium. At a given dew point, the corresponding equilibrium temperature is the lowest heat needed to reduce the oxide under study. At a given heat, the equilibrium dew point is the highest dew point that prevents oxidation.

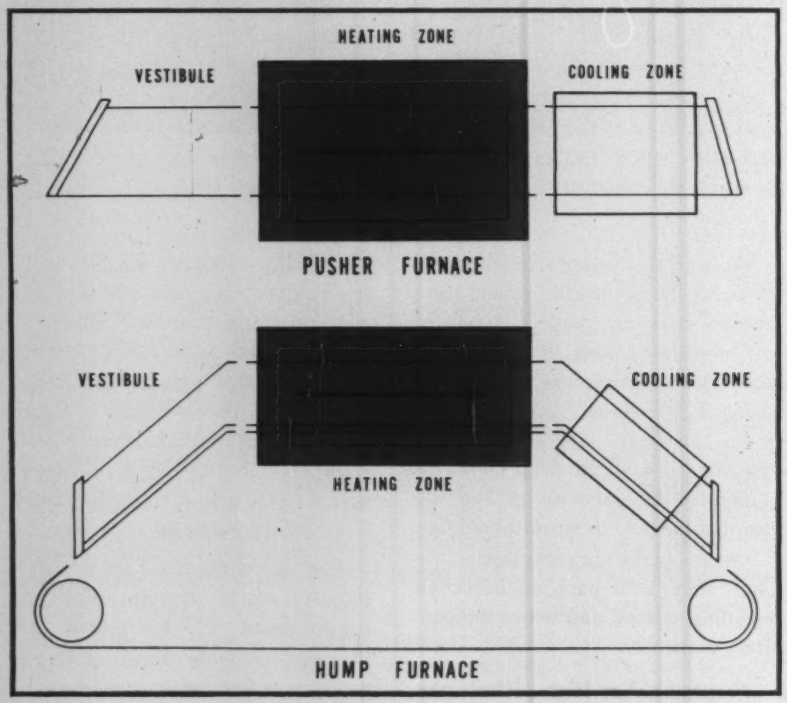
Reduce Oxides—To reduce oxides already present, either a higher heat or a lower dew point than the equilibrium value must be employed.

Sintering conditions for stainless-steel-powder compacts can be plotted—whether a pure-hydrogen or a dissociated-ammonia atmosphere is used. However, these curves will not show reaction time.

Stainless-steel-powder compacts must have high strength and good ductility. Good practice dictates sintering conditions that are more reducing than the combination of a —20°F dew point and a 2000°F heat. Reduction at a given dew point will proceed faster at higher heats. Sintering time will vary with compact density and sintering conditions.

Among the furnace designs that

Compare Basic Furnace Designs



are best suited to the sintering of stainless steel are the pusher and the hump types. In the pusher furnace, the work is manually or mechanically pushed on trays through the heating zone. In simplest form, this furnace consists of a closed muffler—usually metal—inside a heating chamber. The muffler is attached to a vestibule and a cooling zone.

Heats to 2300°F—A pusher furnace may be gas fired or electrically heated. It operates at heats up to 2300°F. The atmosphere enters the muffler at the junction of the heating and cooling zones.

Refinements of this basic design often include heat-resistant rolls. These rolls make it easier to push the trays. Extra doors are sometimes added. The extra doors provide an air lock at either end of the furnace. This reduces contamination of the reducing atmosphere.

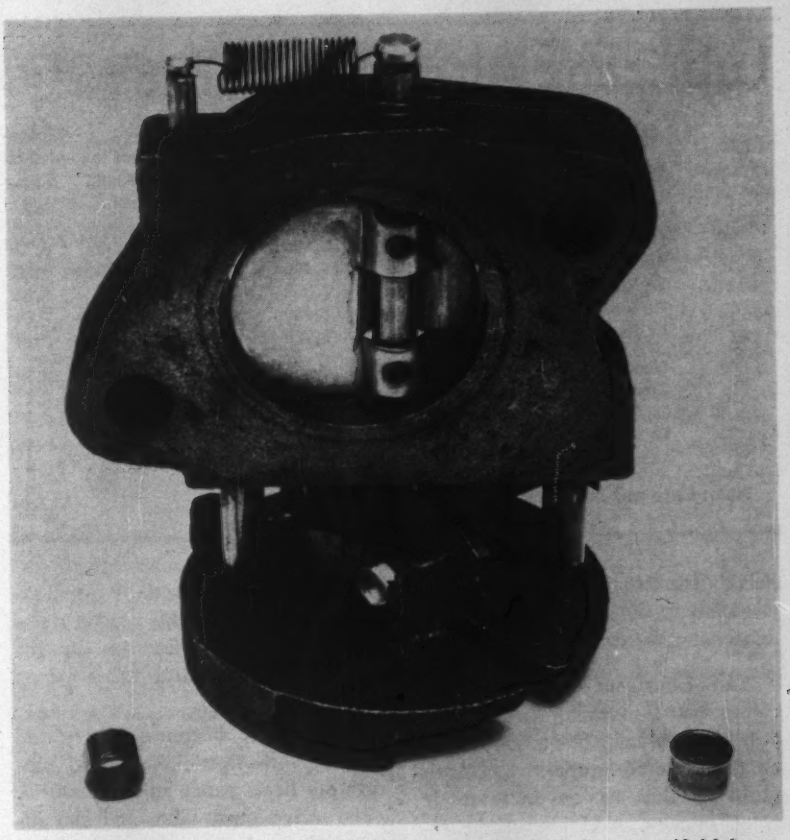
With the pusher-type furnace, production rates vary. Output depends upon part sizes, specifications and the muffler size. Production can run up to 900 lb per hour.

High production rates can also be obtained in hump-belt furnaces. These units also serve for high-temperature brazing. They are rated up to 1000 lb per hour in the larger sizes.

Closed Muffler—Heating can be either by gas or electricity. Some hump-belt furnaces have a closed metal muffler; others consist of a dense refractory chamber with heating elements inside the chamber.

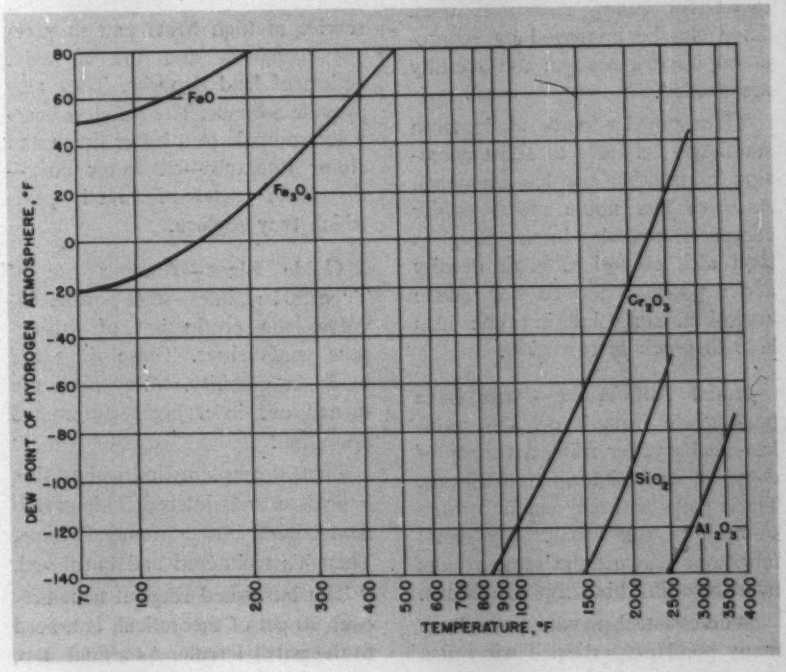
Sustained heats up to 2200°F are possible. A major advantage of the hump-belt design is easy dewpoint control. Why? Because hydrogen—being lighter than air—will be most available in the upper part of the furnace. At the upper level, sintering and initial cooling take place. This reduces atmosphere consumption.

The sintering concepts and the equipment discussed in this article can be applied to any stainless-steel-powder compact with or without lubricants. However the economical production of structural



WITHSTANDS HEAT: Stainless-steel sleeve bearings in a manifold heat-control assembly withstand normal operating temperatures of 1200°F.

Plot Equilibrium Conditions



Lubricant Alters Properties

Molding Pressure, tons/sq in.	Lubricant, 0.75 pct	Density, gr/cc	Carbon, pct	Transverse Rupture, psi	Shrinkage Length, pct	Tensile Strength, psi	Elongation in 1 in., pct
30	None	6.04	0.05	69,000	0.75	24,400	6.25
	Stearic Acid	6.29	0.08	69,000	0.72	32,200	9.38
	Zn Stearate	6.32	0.07	72,800	0.77	31,000	6.25
	Ca Stearate	6.27	0.06	68,900	0.75	32,000	7.81
	Li Stearate	6.28	0.08	75,100	0.75	32,600	7.81
40	None	6.27	0.04	75,500	0.32	37,000	10.94
	Stearic Acid	6.57	0.06	85,700	0.66	35,300	9.4
	Zn Stearate	6.61	0.06	82,800	0.63	37,300	6.3
	Ca Stearate	6.61	0.07	86,000	0.79	37,800	9.4
	Li Stearate	6.64	0.08	90,100	0.79	38,200	12.5

Note: Sintered 1 hour at 2050°F.

parts demands the addition of a lubricant to the metal powder. The lubricant reduces die wear.

Add Lubricant — Consider the values listed in table form. Addition of a lubricant has a good effect on the sintered properties. This is probably due to an increase in green density. Addition of the lubricant also increases shrinkage and it may increase the carbon content of the sintered compact.

Mechanical properties of most stainless-steel compacts are adequate for many structural uses. They can be improved by reprocessing if extra strength and ductility are needed.

Metal-powder parts made from stainless steel have to resist corrosion in multifarious environments. As with less noble metal-powder compacts, porosity in the stainless steel aids corrosion. High density and a polished surface will reduce corrosion. Long sintering times also help to preclude corrosion.

Resist Salt Water—Parts have been made from Type 316 stainless-steel powder using a variety of densities and sintering conditions. These parts will not rust in a 5-pct solution of salt water. Any metal fabricator can get the same results by controlling his shop conditions.

Stainless-steel-powder parts have many good properties. Their range of uses is quite broad. A good example centers on the use of stainless-steel sleeve bearings in the manifold heat-control valve for an automobile.

This valve becomes cherry red during full-throttle operation. Operating heats range up to 1200°F. The valve must withstand the intense heat. It must also withstand attack by corrosive combustion fumes.

Type 304 stainless-steel bearings are used to support the valve shaft. These bearings insure dependable service at high heats and they resist oxidation and the corrosive action of lead deposits. They also provide a bonus. The stainless bearings are made to a better finish and closer tolerance—at lower cost—than the screw-machined parts which they replace.

Guide Rings—Another use of Type 304 stainless-steel powder involves the production of fishing-pole guide rings. These rings are made in quantity. Many sizes are turned out in a highly-automated operation.

First, a simple cylindrical section is pressed and sintered. This part is next coined into a rounded shape. Then it's resintered and burnished.

The burnished ring, at a density over 90 pct of theoretical, is brazed to the pole's ferrule. As a final step, the assembly is given a durable chromium plating.

Production of these guide rings by the powder process is very flexible. Ring diameters and/or wall thicknesses can be easily varied. At the same time, chromium-plated, austenitic stainless-steel rings—with superior corrosion resistance—are produced at little cost.

Less Costly—Cost savings continue to be the main reason for fabricating stainless-steel parts by the powder-metallurgy process. One of the smallest parts made from Type 304 stainless-steel powder is a sprinkler nozzle. This nozzle makes an attractive powder-metallurgy item.

Another outlet for stainless-steel and special corrosion- and oxidation-resistant prealloyed powders is the production of filters. Stainless-steel powders commonly used include Types 304, 316 and 347.

Porus-metal filters are made by several methods. One method uses pressures lower than those used for structural parts. The powder is of selected particle sizes. This helps to provide the desired filtration. Small and intricate filters are often made this way.

Withstand Pressure Drops—Another filter-production method involves the extrusion of powders mixed with a binder. The extruded shape is then sintered to drive off the binder. This provides particle-to-particle contact which gives the strength and ductility needed to withstand pressure drops normally encountered in service.

The second method produces very thin-walled units. Standard thicknesses are 0.030 in. Filters can also be made by this method with 0.015-in. walls. Complex shapes with 100-pct working areas can be turned out.

A new use for stainless-steel powders is the compounding of special materials for high-temperature service. Methods of increasing high-temperature hardness by adding oxides, borides, nitrides and carbides are being explored.

Welders Tackle Huge Bridge Job

Manganese-Vanadium Steel Forms Caisson Cutting Edges

Sound welding requires correct joint design and proper application of the weld metal—no matter how large the part.

Here's a job where each leg of the joint is discussed in tons.

■ Complementing the welding industry in this modern age is a new bridge — The Verrazano-Narrows Bridge.

Welding the huge caisson cutting edges for the two tower piers gave engineers and assembly departments a real challenge. The structures are made of manganese-vanadium steel plate—a low alloy, high strength material.

To understand the size of the job and the nature of the problems, look at some of the specifics—the material, the design and the assembly.

Uses Three Thicknesses—Each of the two units is made up of 28 sub-assemblies, varying in lengths, widths and heights. They're unit welded with stacked tolerances of 1/16 in. between sections. Dimensions must be held to assure good fitup at installation.

Because of its higher strength and good weldability, manganese-vanadium steel got the nod for the job. The steel reduces the amount of reinforcing rod needed in the concrete within the cutting edge region of the caisson. Here space is limited.

Hot-rolled plates of ½, ¾ and 1 in. are used along with structural rolled angles. To speed up operations most of the plates were preformed, prebent and precut.

How Much Welding?—The total length of welding for both cutting edges is 65,000 ft or about 11 statute miles. Filler metal weight totals 13½ tons.

Plates are layed out for flame cutting using radiographs for the beveling process. The ½-in. thick plate is cut at the rate of 10 ipm, ¾ in. plate at 8 ipm and 1-in. plate at 6 ipm.

The outer cutting edges of the caisson are welded by the submerged-arc process. The automated unit pushes out up to 12 ipm. Flux needs are handled by a neutral flux which has no alloying content.

While the steel plate is being welded to the T section, gusset plates are being welded to the other leg of the T with ½ in. double fillet welds.

Tacked By Hand—Angle frames are sub-assembled in a special jig. They're tacked by hand with the shielded metal-arc process using low hydrogen, iron powder electrodes. (AWS E7018)

Overhead cranes place the T end of the assembly on the horizontal. The unit weight at this point is about 15 tons. Plates are then finish-joined with butt welds.

While the root pass is being layed, 100-pct inspection is made from the inside of the assembly to insure perfect fusion. Visual examination of the backing strip must show a cherry-red glow — Tests prove this indicates good fusion.

STRONG SUPPORT—Sub-assembly of internal cutting edge section consists of prebent plates with stiffener angles attached with ¼ in. fillets.

New Family of Refractories Maintains Blast Furnaces

Blast furnace linings can take only so much punishment from heat before they wear out.

Now, new castable materials are helping to get more life out of furnace brickwork—in some cases, up to three years more.

▪ Maintaining blast furnace linings with monolithic materials may no longer be just an emergency measure.

Newly developed castables, gun clays, and installation techniques have been very successful in a number of steel plants. They help producers get more mileage out of the good brickwork still in the structures and reduce refractory costs per ton of iron produced.

This success may lead to a widespread study into the use of monolithic gunning as a planned maintenance procedure. So reports Harbison-Walker Refractories Co., Pittsburgh, developers of these materials.

Speed Is Factor—One of the main advantages of this development is that a complete gunning job can be done rapidly. The furnace is back on the line in record time. When producers are pressed to meet rising production levels, this improved furnace availability will be a vital factor.

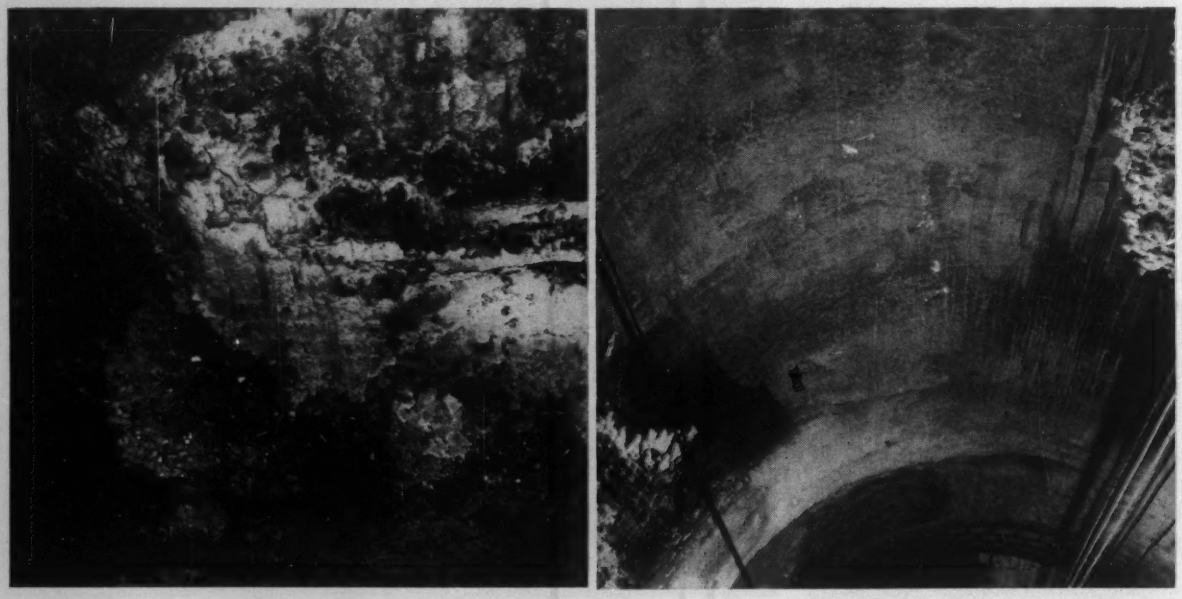
Harbison-Walker points out that a brick relining may take from 40-60 days. But a complete monolithic gunned maintenance installation can be finished in ten days or less. Thus, at relatively little cost and downtime, the original refractory-lining life can be extended by two or more years.

Brings Up to Date—The idea of maintaining blast furnace linings with monolithics is not revolutionary. Company spokesmen point out that they supplied these materials for blast furnace linings over ten years ago.

In recent years, much developmental work has been done in this field. A major installation involved the repair of a worn brick lining from mantle up. By the time this furnace was blown out nearly three years later—due to business conditions—a total of 696,800 tons of iron were produced.

By early 1960, no less than ten other major blast-furnace mono-

Compare "Before and After" Gunning of Furnace



REPAIRS BY GUNNING: Note improvement from a blast furnace lining before (left) to after (right) gunning with new castables. Similar linings are known to be in service more than three years after repair.

lithic installations were completed by Harbison-Walker. The largest one involved the gunning of 267.5 net tons of castable from mantle up in the stack including the stock line wear-plate area.

Tons of Castable — Here's a typical maintenance job. It involved several hundred tons of extra strength castable. Ten tons had to be applied to the wearing area in the top section.

Guide lines were installed to give proper profile. Actual gunning was started at the mantle and continued upward for 32 ft.

Several complete rings of brick were removed at the mantle to provide a ledge on which to start gunning the castable. When this was completed, more brick were removed to secure bonding of the castable to the walls.

Cleans Each Section — At the end of each day's gunning, the finished section was cleaned and trimmed. The top of the gunned castable was cut and trowelled to slope toward the shell.

Then, a vertical key was cut to insure a good joint for the next day's gunning. These sections were covered with wet sacks to keep the castable moist.

Cuts Deep Key—The top section which started under the wearing plates for a height of 5 ft was cleaned. A key was cut in existing brickwork about 6 in. wide x 12 in. deep. It ran completely around the furnace.

The entire surface of this area at the top was covered with 3 x 3 in., No. 10 gage wire mesh anchored to special studs embedded in the present brickwork.

Actual production time varied—according to whether one or two guns were used. But after 117 hours of gunning time, the job was complete. Today, nearly two years later, this furnace lining is still giving excellent service.

Method Catches On — Results indicate an increasing trend in this method of extending blast furnace lining life. There are already cases on record of monolithic furnace linings still in service more than three years after gunning.

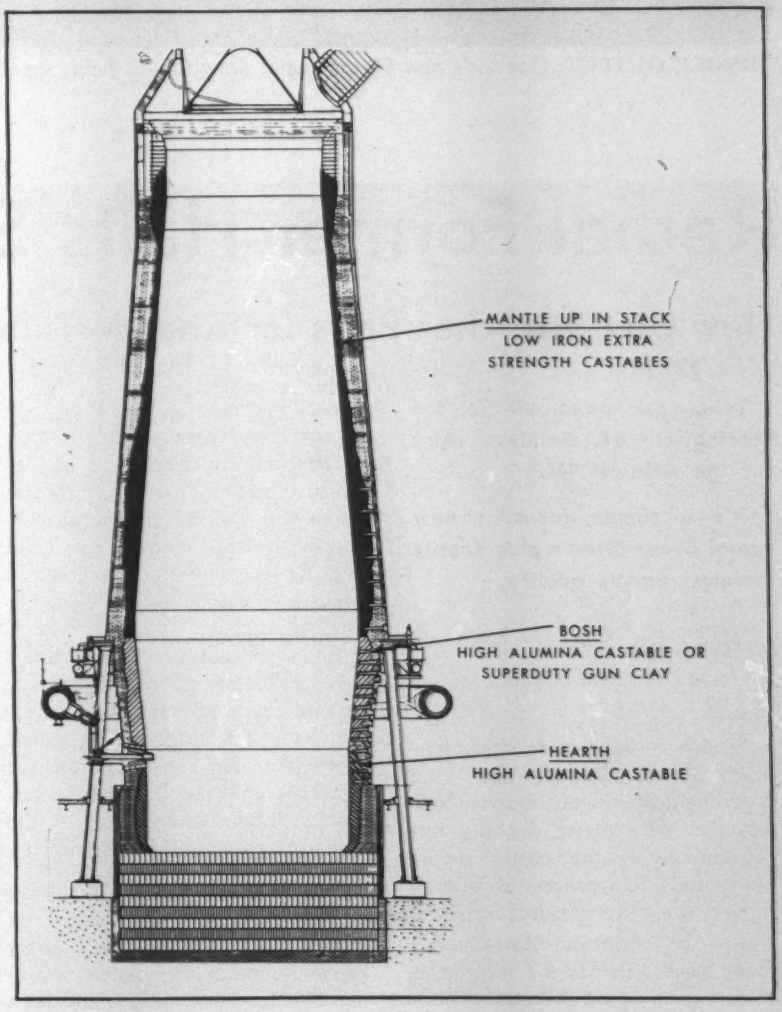
Consider this example. One producer of merchant iron needed at least two more months of service before putting in a complete new relining. As an immediate solution, he decided to patch badly worn areas in the inwall—hoping that this might give him the needed two months. Instead, the furnace ran for 22 months.

Take another example. In July of this year, a gunned lining which had been in service since Jan. 1958 was blown out due to business conditions. It is presumed to be the first gunned lining of a major producer to be examined after such lengthy service.

What were the findings? The gunned castables were in good condition. Consequently, this company started a study of all monolithic materials at both research and plant levels.

The prediction is that this move will probably result in the expanded use of gunned monolitic materials as a planned maintenance program in the near future.

Where to Use Monolithic Linings



WHICH CASTABLE?: Cutaway drawing of a blast furnace lists the type of monolithic materials recommended for the specific furnace area.

MISSILE OUTPUT: Convair's new 93-ton radial draw former helps speed production for Atlas missiles.

Radial Former Halts Scrap Loss

New Unit Stretches Parts for Atlas Missiles

Teamwork pays off in the fabrication of stainless skins for the Atlas ICBM.

It's a simple formula: new radial draw former plus ductile stainless equals quality.

By T. M. Rohan,
Cleveland Regional Editor

■ Stretch forming is reaching new heights these days to meet the prodding demands of the space age. Together with major ductility improvements in the costly superalloy steels, the process is gaining in use along the production lines.

At the Convair Astronautics plant near San Diego, these two factors team up on production lines for the Atlas ICBM missile. Scrap rates on costly stainless are down anywhere from 25 to 1 pct on internal bulkheads.

Stretching is done by a highly-sensitive radial draw former. The stainless steel is designed to provide improved drawing qualities. Cold working is stepping up precious strength-to-weight ratios over the original stock.

Pilot production on formed internal support rings reveals drastic cuts in scrap rates, too. The reduction ranges from more than half down to under 5 pct. Despite the fact that the radial draw former cost $500,000, Convair expects the unit to pay for itself in a few years.

Commercial Jets — In building the Douglas DC-8 commercial jet transport, the "free world's" only known four-way stretcher is forming 50- by 10-ft wing skins in a single piece.

In the past, the traditional stretch press has been the familiar stretch-forming tool. Such presses are common in aircraft plants across the nation. Many of them are made by the Hufford Machine Works, El Segundo, Calif.

These presses contain vertically-mounted central dies with two retracting arms. The arms can be angled from a straight 180° pull against each other to 90° or almost directly behind the die. They are the work-horses of stretch forming in aircraft. However, they don't solve all the problems of the space age.

Radial Former—One costly production bottleneck has been eliminated, thanks to Convair's new radial draw former. Made by The Cyril Bath Co., Solon, Ohio, this unit performs its special task on ductile stainless sheet. The improved metal comes in from Wash-

ington Steel Co., Washington, Pa.

Inside each Atlas missile is a saucer-shaped bulkhead which separates the liquid oxygen from the fuel. The bulkhead consists of 11 thin stainless pie sections. These compound-curved sections are welded together to form a complete circle. Thickness of this section and outer shell sections is under 0.040 in.

The thin sections were formerly farmed out to other aircraft plants which had their own stretch presses. However, scrap rates were too high —about 25 pct. The margin between the yield strength and the ultimate tensile strength was too close to hold with a mechanical linkage.

It Adds Up — Scrap rate was costly, too. The reason: sheet metal used was worth about $15 to $20. Figure in labor and your investment jumps to $100 by the time materials reach the forming stage.

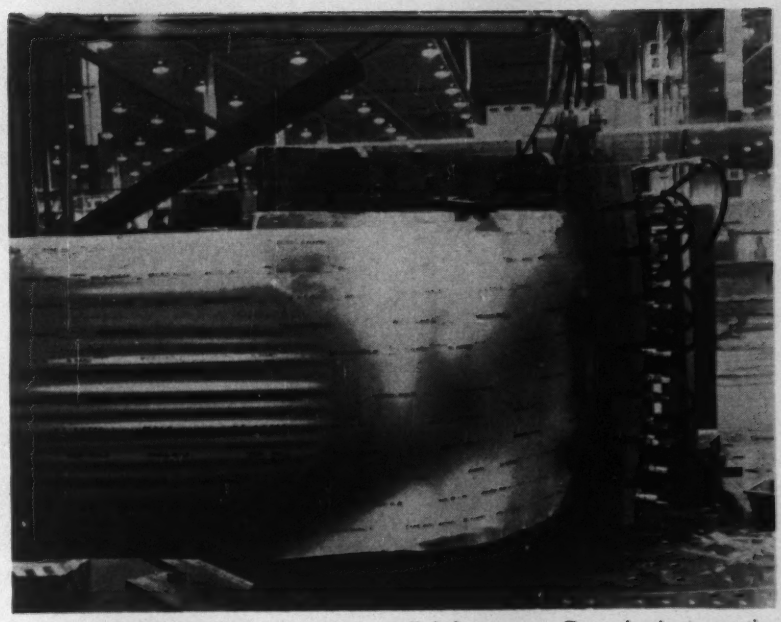
It's not just a question of avoiding straight fracture. Other drawing problems are also involved. You have to eliminate minute wrinkles and corrugations which sometimes don't show up until later.

Use of the Bath radial draw former with a heavy assist from the improved stainless has cut the scrap rate to under 1 pct. All forming is now done under one roof.

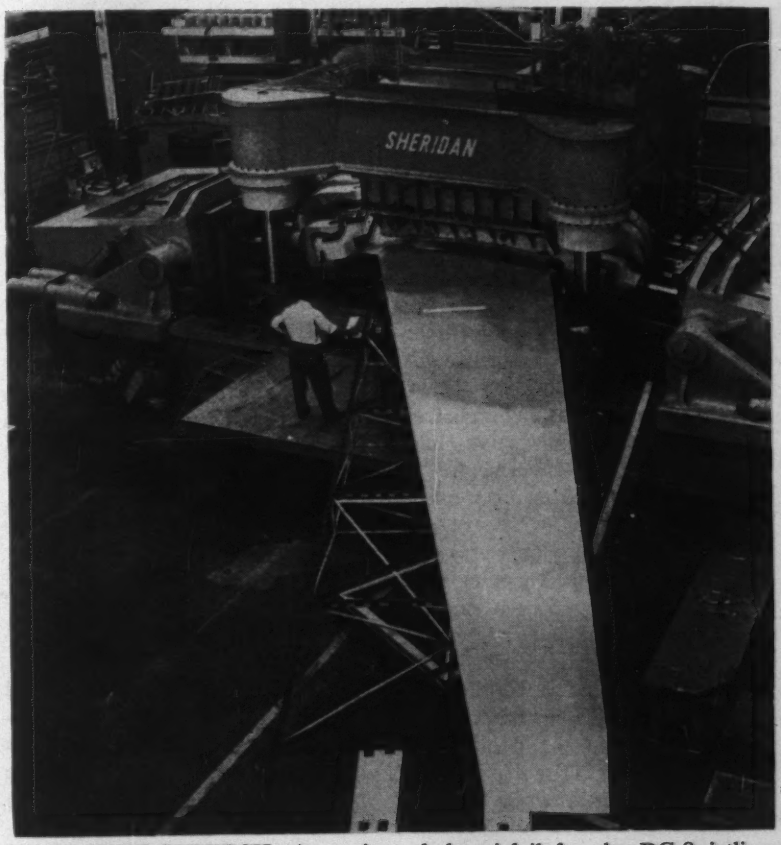
Built-in Tester—The Bath former is the first fully-hydraulic machine to eliminate nearly all the mechanical linkages. Also, the machine has a tensile tester that calculates each sheet individually for the yield point. The tester limits pull so that ultimate tensile strength is not reached.

As a result, its pulling force can exert as little as two tons, too fine for other equipment, right up to the full 50-ton capacity. The tensile tester has even caught sheet that has passed receiving inspection.

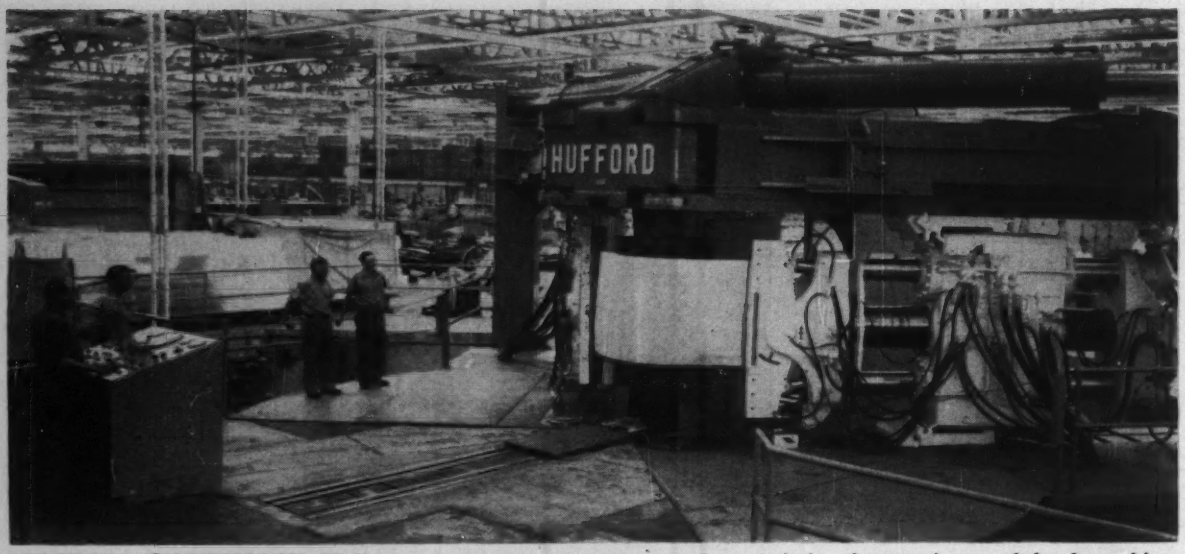
Since all stretch formers work in the area between yield and ultimate tensile strengths, their object is to pull the metal just enough without ripping it. Aluminum can be stretched freely. Carbon steel



SCRAP REDUCTION: New Bath radial former at Convair Astronautics cuts scrap rate from 25 to less than 1 pct during delicate forming job.



FOUR-WAY STRETCH: A portion of the airfoil for the DC-8 jetliner is formed by four-way stretcher from a 10- by 50-ft aluminum plate.



AIRCRAFT WORKHORSE: Hufford stretch press at North American Aviation forms wings and fuselage skins.

grades have a range of about 20 pct. The higher alloy steels, however, have a margin of only 5 pct.

Variations—In the original stainless, variations from one sheet to another were greater than the entire specified range. On such materials, the tensile tester and fine adjusting control really became vital.

The Bath unit is so sensitive that it permitted the Atlas builders to go from ½ hard to ¾ hard stainless. Thus, the gage of the sheet could be lightened without sacrificing strength.

No Shortcut — "We sometimes have to roll five tons of steel to get one ton to ship to San Diego," says F. G. Gerard, Washington Steel vice president, "and we've had variations from the same heat.

"We have worked up from using half hard material with 18 pct elongation, to three quarters and even full hard with 8 pct elongation. Lately, we have been supplying extra full hard material."

According to Mr. Gerard, Washington Steel is now working on "super full hard" material. That one isn't even in the book. This grade has a 200,000 psi minimum yield strength with a tensile strength in the 250,000 psi range. Yet this material still has room for good stretching qualities.

Skill Required — "The trickiest part of rolling these grades," says Mr. Gerard, "is getting a balanced analysis and allowing the right final reduction to get the tight physicals.

"The finished sheet also must be straight and flat. A perfect surface, free of any defects, is also required. This surface is achieved on continuous strip polishing machines."

Pilot work now being done on back-up rings shows the true versatility of the Bath former. These internal circumferential rings are the only support for the Atlas skin. At present, the rings are made in quarter sections, then welded together to form a complete circle. They're formed in sections because stretch formers have maximum working angles of 180°.

Single Pull—However, the Bath former needs just one pull to complete a 360° ring. In the pilot stage, scrap rate on these "super-alloy" rings has been reduced from 25 pct to less than 1 pct.

Strip is slit from coils and cold formed on a Yoder mill to U-shaped channels. Rolling, thickness and edge trimming have to be precise. This will prevent breaking at the thinnest section during drawing. After drawing, some areas are blanked out to lighten the mass.

The four-way stretcher is at work in the Santa Monica, Calif. plant of Douglas Aircraft Co., Inc. Installation cost of this unit totalled $750,000.

Aluminum — Material stretched is Type 7075 aluminum plate. This alloy is taper rolled by Alcoa from 0.230 in. to 0.135 in. The inboard section is placed in the press where four jaws pull it over a shallow die with a force of 300 tons.

The die raises with a force of 450 tons to do the forming. The skin is then trimmed and placed in an aging oven. It's also anodized before transfer to the wing assembly area.

The single-piece inboard wing skin eliminates joints and splices. Both of these factors have contributed to fatigue problems in the past.

New Design—The wing loading for them is more complex than for earlier planes. While regular straight wings have a simple bending load, the swept-back wing adds a twisting load. As a result, wing root sections must have quite a bit of sheer bulk to resist stresses.

The aluminum plate, incidentally, is shipped and stored at subzero temperatures to prevent age hardening. As such, the plate can take "the stretch."

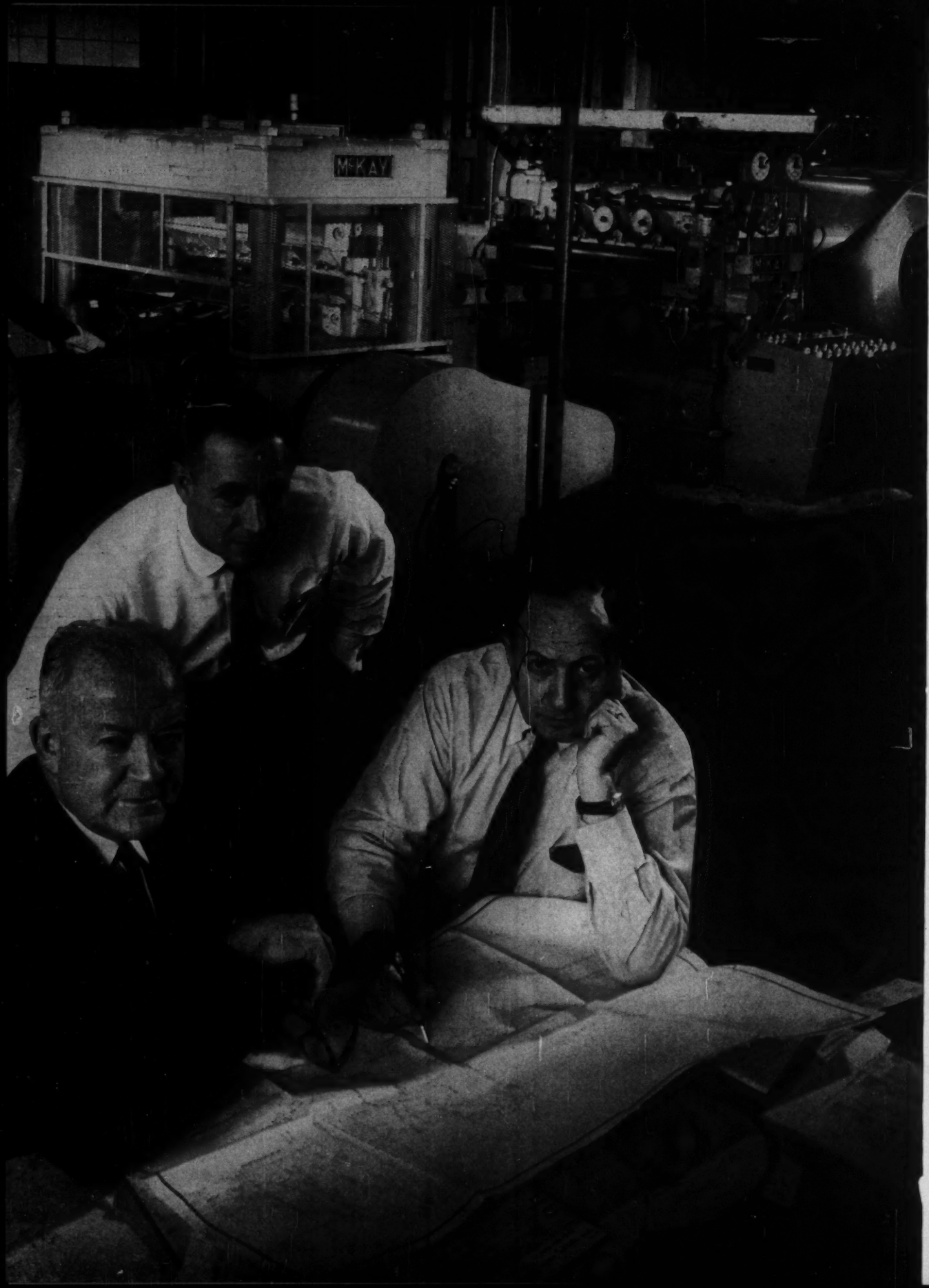
in 1960...

LOOK TO

McKAY MACHINE

FOR PROGRESS IN METAL PROCESSING

FOR EXAMPLE, the revolutionary new McKaymatic* Die Shear Line that has reduced costs and cut scrap losses for many steel makers, warehousers, and fabricators. For the complete story on one of these — Eastern Stainless Steel Corporation—please turn the page.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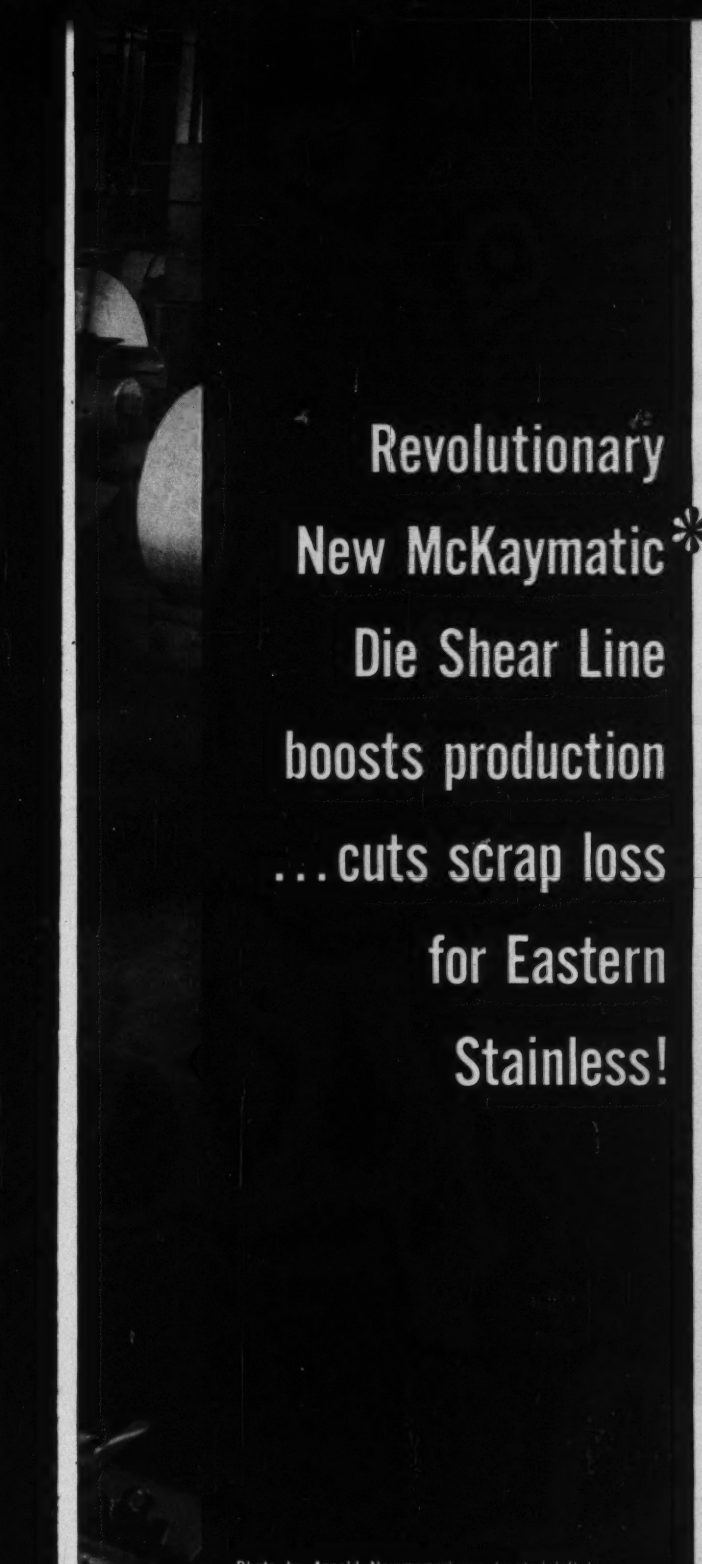

Revolutionary New McKaymatic* Die Shear Line boosts production ...cuts scrap loss for Eastern Stainless!

Photo by Arnold Newman shows (seated left to right) W. F. Schneid, vice president—general manager, and H. J. Verner, chief engineer of Eastern Stainless Steel Corp., discussing cost reductions in stainless steel processing with (standing) McKay Machine sales engineer, Robert D. Lynn, in front of a McKaymatic* Die Shear Line recently installed in Eastern Stainless' cold strip department.

"We consider the McKaymatic* the finest advancement in shearing to come along in a great many years," says W.F. Schneid, vice president-general manager, of Eastern Stainless Steel Corporation, Baltimore, Md. "We have reduced production time, cut our scrap loss, and have recorded an overall increase in department efficiency as a direct result of this new McKay die shear line," Mr. Schneid continues.

Eastern Stainless is a prime supplier of stainless steel sheets, strip and plates, for aircraft and missile parts, for food, chemical, paper and textile machinery and for architectural uses. It produces 25 grades of stainless steel in its own modern electric furnace facilities, and ships about sixty-six percent of it in sheet form.

Programs many grades instantly—Through improved roller leveler techniques, Eastern Stainless found it was able to instantly program many grades of sheet through its new McKaymatic* Die Shear Line. The line decoils, levels in a 17-roll McKay Roller Leveler, measures by electronics and cuts to length—replacing a cut-up, re-level, and re-square operation prior to boxing. Production of cut lengths has been substantially increased.

The result, they report, is cost savings. Says Mr Schneid: "As a result of our efforts to improve customer service, we installed this line to speed up production of these cut lengths. It has enabled us to break a production bottleneck for which there seemed to be no solution."

Line eliminates stretcher leveling—Mr. Schneid continued that production time has been reduced on sheets of five grades as a result of being able to eliminate stretcher leveling and re-squaring procedures. Also, he said, the scrap loss on re-squaring has been eliminated as the sheets are cut clean and square on the McKay line. Net effect of the installation was a definite increase in overall departmental efficiency.

H. J. Verner, chief engineer, remarked that the McKay roller leveler could process these grades of stainless, within its capacity, to flatness approaching that obtained from the stretcher method. He reported that the Die Shear Line is being used to prepare for shipping cold rolled sheet from 4" to 48" in width, up to .050" in thickness, and in lengths from 36" and greater at normal production speeds. He particularly likes the McKaymatic* Die Shear Line for its ability to handle high finish stainless without edge or surface damage.

Available in many sizes—The McKaymatic* Die Shear Line is available in sizes to accommodate most commercial widths. Composed of decoiler (with coil car, if desired), roller leveler, measuring device, and cutoff press, it satisfies most requirements for sheet length accuracy and squareness, flatness, edge and surface quality protection and output rate.

For short runs or long, the McKaymatic* Die Shear Line will better any other line in economy and efficiency. Whatever your cut-to-length problem, McKay Machine's engineers have a solution. Write for literature; send your specific needs for a quotation to *McKay Machine Company, Youngstown 1, Ohio.*

*TM

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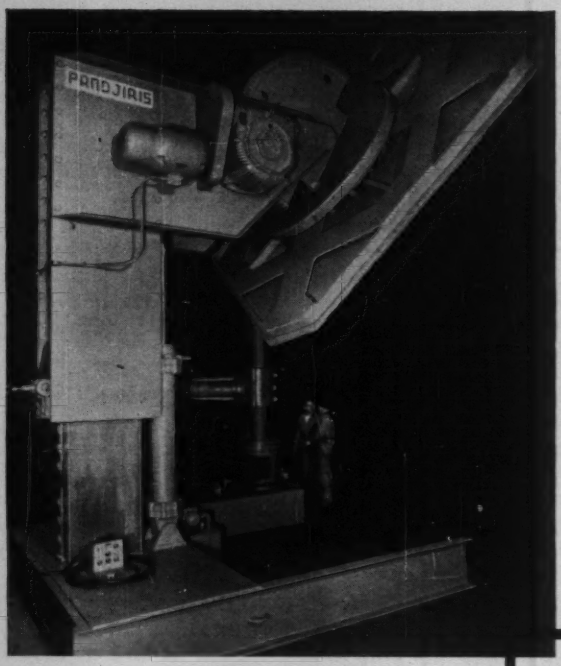
FOR PROGRESS IN METAL PROCESSING



Put 20 tons where you want it

Position of the work is mighty important when welding. This 20-ton capacity positioner tilts, rotates and elevates automatically. Two standard Cone-Drive **double-enveloping worm** gear reducers provide the drive and tuck away compactly under the table.

Compact Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

CONE-DRIVE GEARS

DIVISION MICHIGAN TOOL CO.
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Added capacity at lower cost

Putting standard Delta 11" metalworking lathes on the job expanded the capacity of the lathe department at the Armaments Division of Universal Match Co., St. Louis, at surprisingly low cost. And, according to shop men, the Delta lathes work right alongside—and keep up with—costlier, heavy duty equipment. In addition to lowering initial tool investment, Delta lathes provide savings in set-up and operating time and greatly reduced maintenance.

This is another example of how thousands of metalworking plants are using rugged, versatile and highly accurate Delta Industrial Tools to supplement or replace special purpose machines. Write for free, 64-page illustrated booklet of cost cutting ideas: Rockwell Manufacturing Company, Delta Power Tool Division, 640J, Lexington Ave., Pittsburgh 8, Pa. In Canada: Rockwell Manufacturing Company of Canada, Ltd., Guelph, Ont.

PATENT REVIEW

New Patents In Metalworking

Removes Ash

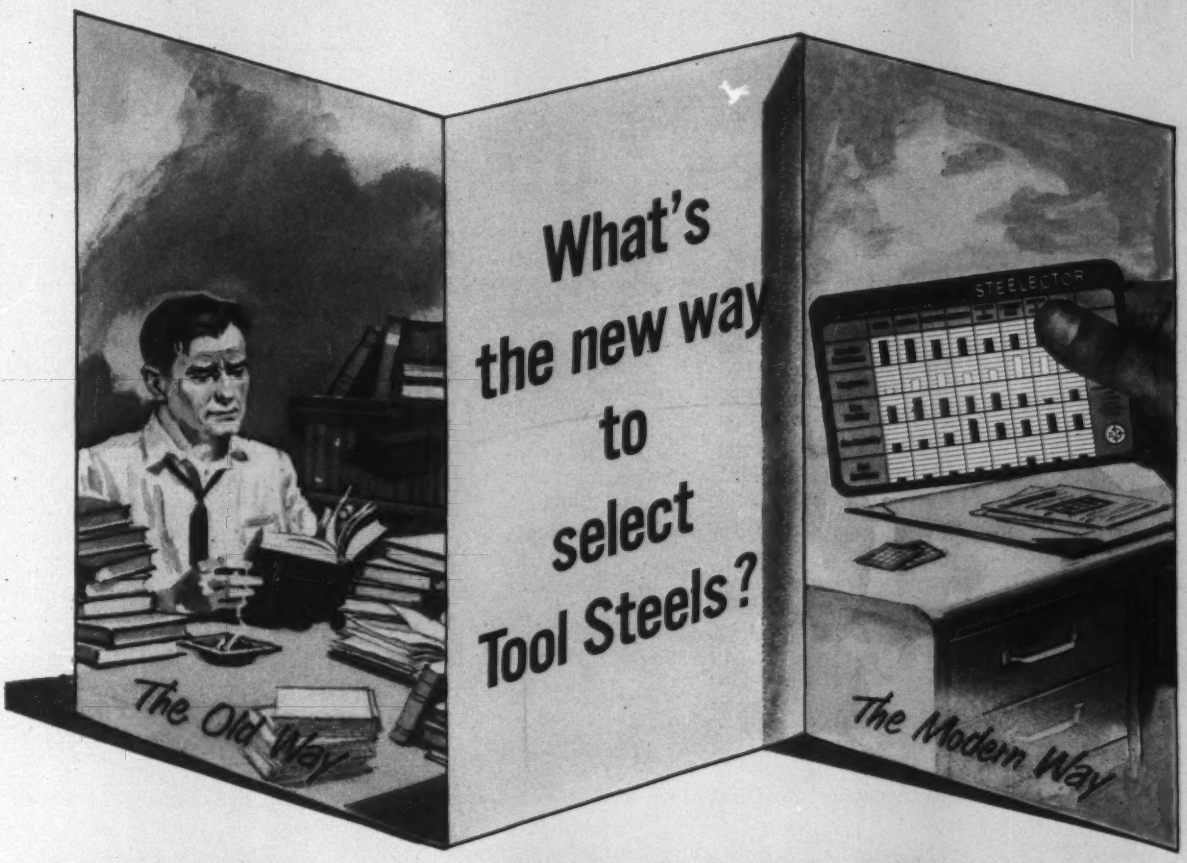
Method of coating hot-dip galvanized pipe, C. R. Lynch (assigned to U. S. Steel Corp., Pittsburgh), July 12, 1960. Method for clearing out ash adhering to the interior of steel pipe, when it is withdrawn from a galvanizing bath. The trailing end is moved through a quenching bath. The resulting vapor carries the ash out the leading end of the pipe but does not reduce the amount of the zinc coating. No. 2,944,925.

Increases Strength

Method for increasing the strength of sintered ferrous articles, A. R. Shaw and F. W. Sampson (assigned to General Motors Corp., Detroit), July 19, 1960. To increase the strength of sintered metal articles made from ferrous metal powder, 20-32 pct graphite is added to the sponge iron powder prior to briquetting and sintering. The graphite is a mixture of minus 325 mesh artificial graphite and 20-30 mesh natural flake graphite. No. 2,945,-759.

Aids Ore Concentration

Magnetic roasting process and apparatus, N. F. Schulz (assigned to Regents of the University of Minnesota, Minneapolis), July 19, 1960. Method for roasting non-magnetic taconite ore or the like, to enable magnetic concentration methods to be used. The crushed ore is moistened and rolled to agglomerate the fines. The resulting compacts are laid on a moving grate in a thin bed and roasted by being passed successively through a drying zone, a reaction zone and a cooling zone. A hot reducing gas is used in the reaction zone. No 2,945,755.



Use the A-L Steelector System

The man on the right is using the new way. With the new Allegheny Ludlum STEELECTOR he can select tool steels virtually at a glance. Best of all, he knows that his first choice is in stock—available right when he wants it. No longer does he have to waste hours looking through handbooks and catalogs only to find that he has selected a brand that is unavailable . . . or entails expensive delays because he must wait for the mill to make it.

With the STEELECTOR, picking the proper tool steel is an easy job. All you have to do is look at the STEELECTOR Card designed for the job at hand. There are STEELECTOR Cards covering general purpose tool steel applications, hot work applications, and high speed grades. A glance at the card compares the five basic tool steel properties—abrasion resistance, toughness, size stability, machinability, and red hardness—of each of the STEELECTOR tool steel grades.

Bar graphs show how the steels compare so it's simple to check the properties most important to you and pick the grade with the combination of properties you need. The three STEELECTOR Cards list grades that will suit 96 percent of all tool steel applications—as shown by an actual survey of the authoritative A-L Tool Steel Handbook.

Backing up the STEELECTOR Cards are Data Stock Lists for every grade. They list the complete necessary range of sizes and shapes available and typical applications. They also include heat treating and other data to assure you that you have made the proper selection.

You can put full confidence in STEELECTOR grades because they have been selected from the complete line of A-L Tool Steels and are made under the rigid quality control standards common to all A-L products.

To take the guesswork out of tool steel selection, ask your Allegheny Ludlum sales representative for your copy of a colorful STEELECTOR Bulletin that contains all three STEELECTOR Cards, describes the tool steels, and explains the Data Stock Lists, or write: *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pennsylvania. Address A-9-1.*

STEELECTOR PROGRAM

ALLEGHENY LUDLUM

Tool Steel warehouse stocks throughout the country

2082

Great Lakes puts the heat on

A constant drive to hammer down production costs and deliver finished stock which customers will order a second time (or a twentieth) is apparent in the way the Great Lakes Steel Corporation "puts the heat on" their ingots, slabs, and coiled strip.

Fast heating shortens the time between ingot and strip. Uniform temperatures through the steel result in improved slabbing and rolling. Consistent annealing produces strip with the formability which reduces customers' costs. Great Lakes' selection of Surface equipment on existing facilities performing these heating jobs is justified by the fact that no other supplier has applied heat in so many ways—wherever metals are produced or worked. You are invited to make the most of this great fund of heating technology. Surface Combustion, 2402 Dorr Street, Toledo 1, Ohio.

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Forty Surface recuperative soaking pits, one-way, fired from the top.

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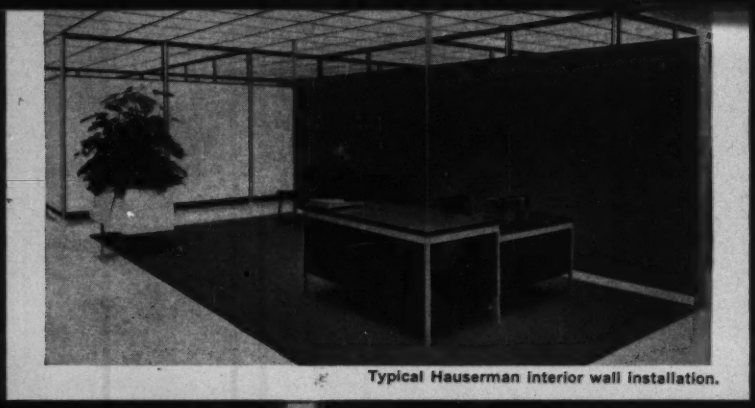
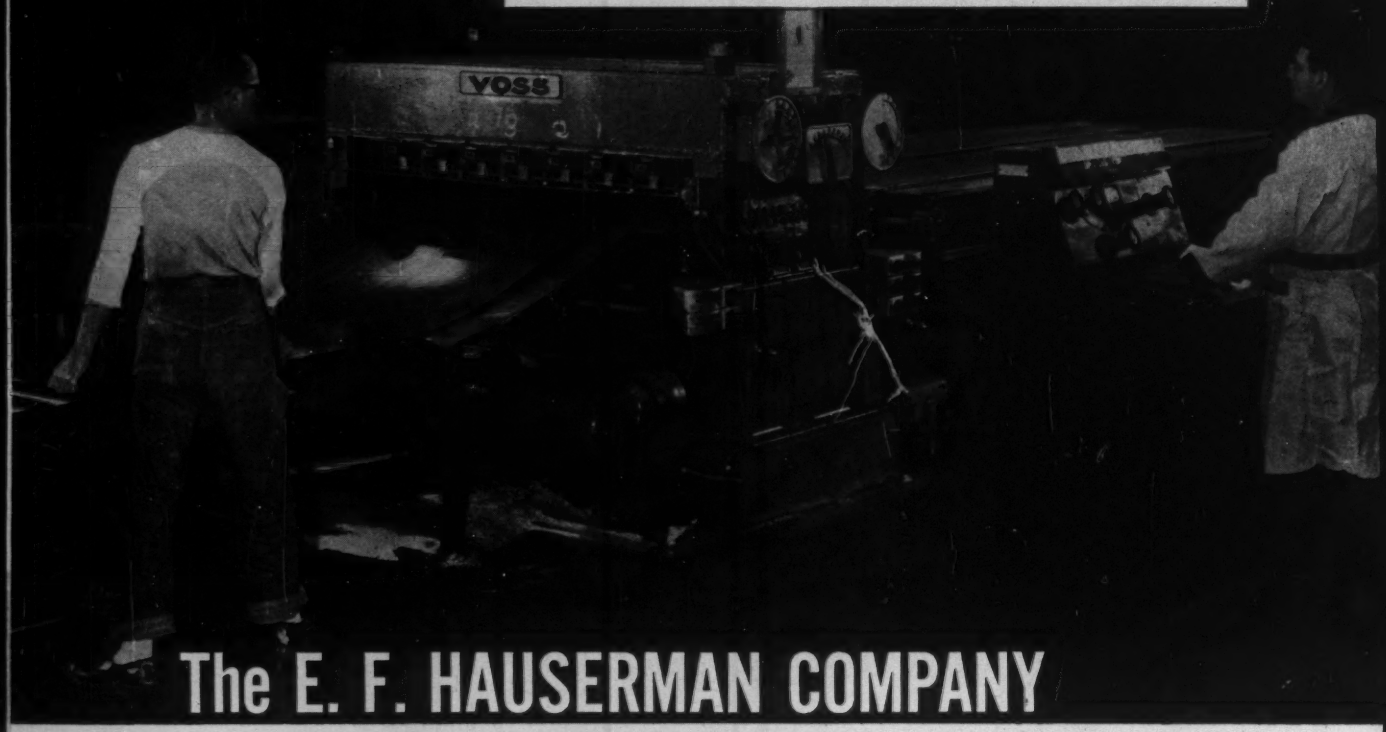
Forty-four Surface multiple stand annealing furnaces with 108 bases; right: forty-six Surface single stand annealing furnaces with 116 bases.



Typical Hauserman interior wall installation.



The E. F. HAUSERMAN COMPANY

Gets Dead Flat Sheet Steel with VOSS Roller Levelers

...and saves time and money doing it!

Hauserman standards are *tough*. Every sheet of steel used in a Hauserman movable interior wall is inspected on a slate table for absolute flatness. Before Voss levelers were installed, the company used stretcher-leveled sheets . . . and still had to reject 33% as not meeting their severe specifications. Now steel is ordered in coils, and Voss-leveled on their own processing line. Rejects are consistently held under 5%, and the company gains the economy and flexibility of handling steel in coil form. Voss levelers have operated at Hauserman for 10 trouble-free years. They help the company maintain the most rigid quality standards in the movable partition industry.

Voss levelers are currently at work in plants of many primary steel and aluminum producers and major fabricators. Applications include high speed galvanizing lines, hot and cold rolled shear lines, steel plate, aluminum sheets and coils, and others. Let Voss put its experience to work on your leveling problems.

Voss ENGINEERING CO.

7301 Penn Ave. Pittsburgh 8, Pa. Churchill 2-4422

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy, just circle the number on the free postcard.

Vibrating Feeders

Straight-line vibrating feeders are described in a six-page folder. The feeders incorporate a new principle of vibration for high-capacity, controlled feeding of heavy and highly-abrasive bulk materials. (Link-Belt Co.)

For free copy circle No. 1 on postcard

Steel Selection

The job of selecting the right steel for machine parts, for research and development, is much easier with the aid of a folder containing ideas for this problem. (La Salle Steel Co.)

For free copy circle No. 2 on postcard

Power Cylinders

Top quality, immediate shipment, and substantial price savings are the keynote of a bulletin on "stock" air- and hydraulic-power cylinders. The center spread of the four-page bulletin gives the strokes, prices, and dimensional data on the expanded stock selection. (Miller Fluid Power Div., Flick-Reedy Corp.)

For free copy circle No. 3 on postcard

Filtering Equipment

Descriptive literature shows the uses of filtering equipment for machine tools. An easy to install, easy to use filter fits grinders, honers, saws, tappers, hobbers, drills, saw mills and screw machines. (Industrial Filters Co.)

For free copy circle No. 4 on postcard

Hydraulic Valves

Two data bulletins on small, spool-type 4-way hydraulic valves —that provide 11 flow patterns— have just been published. This free literature covers the spring-centered, spring-offset and detent models, designed for use in small, high-pressure circuits, where flow is 3 gpm or less and operating pressure is 0 to 2000 psi. (Sarasota Precision Products, Inc.)

For free copy circle No. 5 on postcard

Bag Dumper

The dumping of bagged material is made easy with a new bag dumper. Bags of all types may be emptied. These include: burlap, multiwall, open-mesh, cotton, polyethylene as well as other textiles and plastics. Detailed information on all models is contained in a bulletin available from the manufacturer. (Conveyors and Dumpers, Inc., a div. of Mercury Industries)

For free copy circle No. 6 on postcard

Power Supplies

Power supplies connected in parallel, to provide low-cost, regulated dc power-supply systems of greater power output and higher current ratings, are described in a cost-saving tip in an application note. (Sorensen & Co.)

For free copy circle No. 7 on postcard

Electric Fork Trucks

A new four-page bulletin gives complete details and specifications for a 6000-lb capacity electric fork truck. In two colors, the bulletin contains line drawings that show dimensions and the turning radius of the truck. (Industrial Truck Div., Clark Equipment Co.)

For free copy circle No. 8 on postcard

Electronic Weighing

A brochure traces the development of the electronic null-balance principle used in the indicating system of a modern line of testing machines. The principle is also used in stress-strain recorders and strain instrumentation. Recent developments in automatic read-out systems for printing ultimate and intermediate test data, such as

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Circle numbers for Free Technical Literature, Design Digest, or New Equipment:

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41	42	43	44	45	46	47	48	49	50
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Product Manufactured .....

Company .....

Co. Address .....

.....

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FREE LITERATURE

yield strength, along with low-capacity load cells are also discussed. (Tinius Olsen Testing Machine Co.)

For free copy circle No. 9 on postcard

Closed-Circuit

Detailed information on a transistorized closed-circuit television camera is covered in a bulletin. The bulletin also explains the low installation, operating and maintenance costs of the model, which performs under extreme vibration and noise. (General Electric Communications Products Dept.)

For free copy circle No. 10 on postcard

Wash-Off Film

A polyester wash-off film, which produces erasable ink-black lines from pencil originals, and permits ink or pencil-drawn additions, is fully described in a product data sheet. (Keuffel & Esser Co.)

For free copy circle No. 11 on postcard

Motor Controls

Fifty-six pages of descriptions, ratings and prices, for manual and magnetic starters, drum controllers, pressure, foot and limit switches, comprise a handy pocket catalog. Included also are push buttons and related pilot devices. Motor rating and heater coil data, plus simplified tables make control selection easy. (Furnas Electric Co.)

For free copy circle No. 12 on postcard

Ferrocolumbium

A folder on Vancoram Thermocol, an exothermic ferrocolumbium, cites higher columbium recoveries, shorter furnace time and lower steel-production costs as product advantages. (Vanadium Corp. of America)

For free copy circle No. 13 on postcard

Boring Machine

A bulletin describes the design, construction and operating features of an opposed-head precision boring machine; including complete specifications. The bulletin covers features of special interest. (Pope Machinery Corp.)

For free copy circle No. 14 on postcard

Surface Plates

A bulletin describes a full line of black granite surface plates; welded stands for plates and thinner granite plates which are bonded to worn out iron plates instead of re-scraping them. (Victor Brook Co.)

For free copy circle No. 15 on postcard

Timing Belt Drives

Offered in a bulletin are simple steps to the selection of timing belt drives. The steps give a method involving a minimum of mathematics for the selection of a drive to fit any application. The bulletin includes five sets of curves for drive-width selection. (T. B. Wood's Sons Co.)

For free copy circle No. 16 on postcard

Air-Control Valves

Inline 2-, 3-, 4-way valves, and sub-base mounted 4-way and 4-way 5-port valves are covered in a 40-page catalog. These include valves that are air operated, solenoid-pilot operated, that have solenoid pilot and booster, and double solenoid pilot. The catalog features valve selection tables and parts tables, and cut-away drawings of valves. (Hoffman-Odom Co.)

For free copy circle No. 17 on postcard

Reclaimed Alumina

How a firm boosts its alumina yield, by a highly-specialized reclaiming process, is the subject of a bulletin. The process extracts the precious powder from refuse mud. Complete with illustrations, the four-page report sets forth in detail each step of the system. (Fuller Co.)

For free copy circle No. 18 on postcard

Foot Switch

Uses and specifications for a new rheostat foot switch are contained in a short bulletin. Used to control the speed of fractional electric motors to 1/15 hp, the switch's ceramic-covered resistance coil (maximum 350 ohm) remains cool under all normal operating conditions. Coil rating is 0.8 amp at 125 v ac or dc. (Linemaster Switch Corp.)

For free copy circle No. 19 on postcard

Crushing Machines

A bulletin illustrates and briefly describes each type of crusher in the manufacturer's line. It also indicates typical uses. It's a good guide to preliminary crusher selection and is keyed into more detailed bulletins on specific crushers. (Pennsylvania Crusher Div., Bath Iron Works Corp.)

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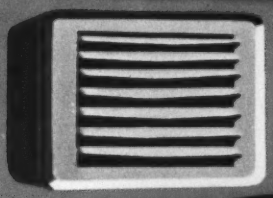
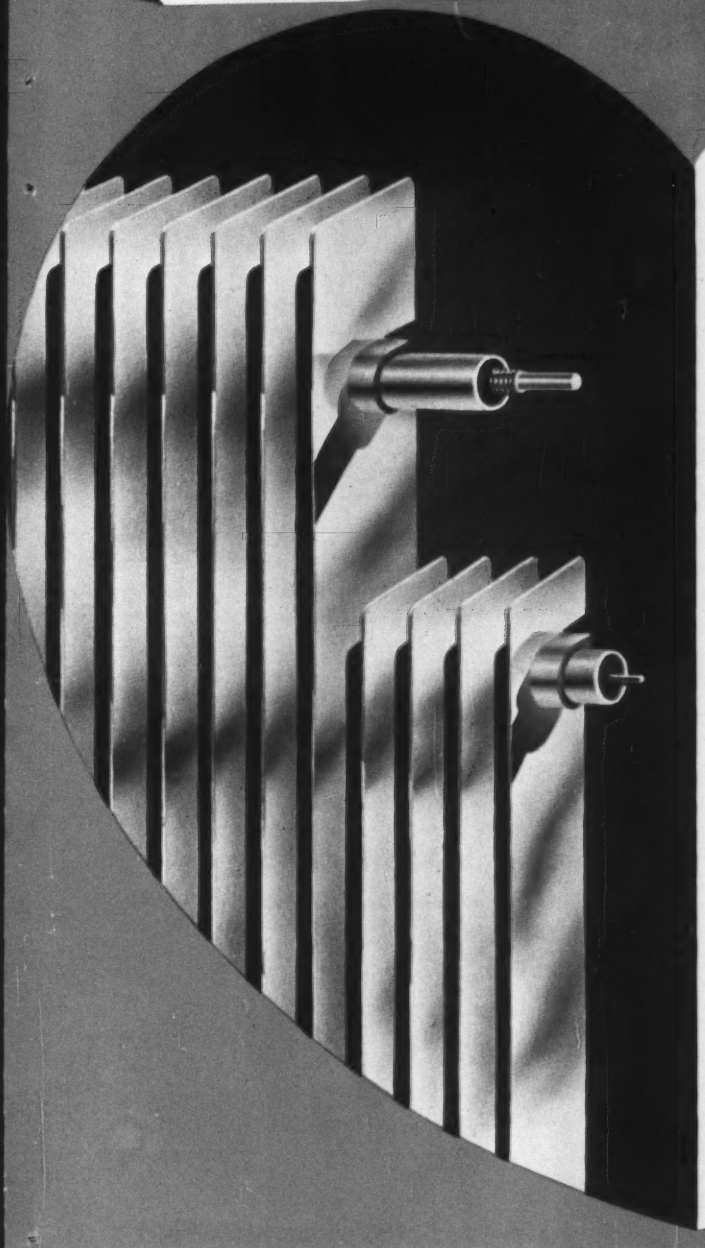


this electric unit heater has a stainless heart



for | better function
longer life

Superior

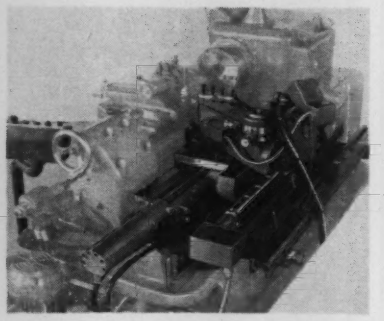
STAINLESS STRIP STEEL

The electric unit heater illustrated is a product of MARKEL Electric Products, Inc., Buffalo 3, N. Y.

In this high-efficiency, heavy duty electric unit heater, Superior Stainless Strip Steel does a vitally essential job. The helical coil elements are sheathed in our stainless—the heat-distributing fins are Superior Stainless too. Only stainless combines the physical strength, long life and corrosion resistance required by this exacting application . . . and *Superior* Stainless provides the unvarying quality and uniformity required for trouble-free fabrication. Can we serve your own special projects for stainless steel?

SUPERIOR STEEL DIVISION
OF
COPPERWELD STEEL COMPANY
CARNEGIE, PENNSYLVANIA
For Export: Copperweld Steel International Company, New York

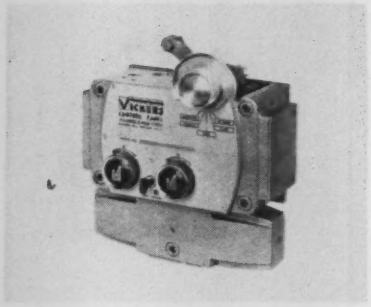
New Materials and Components



Tracing Device Makes Great Number of Passes

Self-contained, a tracing attachment has its own complete electrical and hydraulic power-supply system. The attachment rough cuts and finishes in proper sequence, switching from rough to finish automatically. The cycle control is fully automatic with rapid traverse on the return. With a special switch gear, the machine is capable of making an unlimited number of passes. The latest all-hydraulic tracer cuts in both directions. It is capable of making a full ¾-in. diam reduction on a single pass. Its maximum tracing length is 30 in., its stroke, 4 in. (Man-Au-Cycle Corp. of America)

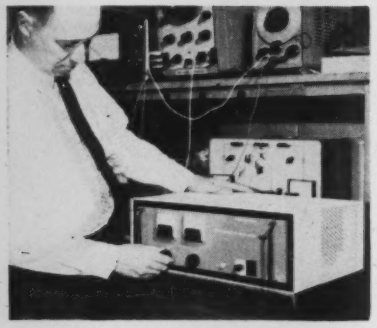
For more data circle No. 21 on postcard, p. 81



Panel Controls Industrial Operations

A traverse and feed panel provides a compact and precise control unit for the many drilling, boring, reaming and milling operations in industry. It incorporates solenoid-controlled directional movements, and cam-actuated coarse and fine feed rates for maximum tool efficiency. The mechanically-actuated portion of the panel can be separated from the solenoid-controlled directional unit. This allows the panel to be mounted on the machine-tool slide in a very small space. These controls integrally mount on all but the smallest of the proposed standard units. (Vickers Inc.)

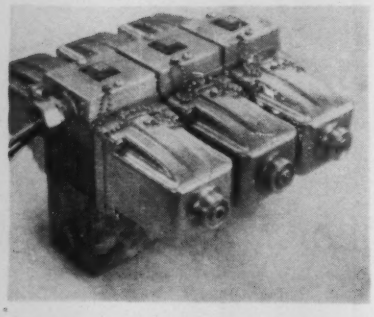
For more data circle No. 22 on postcard, p. 81



Line of DC Power Supplies Is Self-Resetting

For completely static operation, a line of dc power supplies features convection cooling. It provides lower preventive maintenance and quieter operation with no difference in noise level, between on and off. The unit's improved circuitry and design reduce required components by 25 pct. A "constant watts" circuit protects the units against overloads, short circuits and high line voltages. The complete line of 30 standard transistorized dc power supplies comes with output voltages ranging from 1.5-100 v. The power supplies are designed for laboratory, test and original-equipment applications. (General Electric Co.)

For more data circle No. 23 on postcard, p. 81



Direct-Acting Solenoid Valves Mount on Manifold

Mounting on 2⅝ in. centers, a line of ⅜-in. size solenoid valves features multiple mounting. The valves come as double or single solenoid, spring-return types; two, three, or four way; two or three position. The valves can be used for air, vacuum and all conventional hydraulic fluids. All valves have a built-in electrical junction box. With junction-box covers removed, the valve design provides a wide-open conduit for the easy installation of wiring. When multiple mounted, it is possible to remove an inner valve from the manifold without disturbing the wiring of adjacent valves. (The Beckett-Harcum Co.)

For more data circle No. 24 on postcard, p. 81

Reverse Drivers

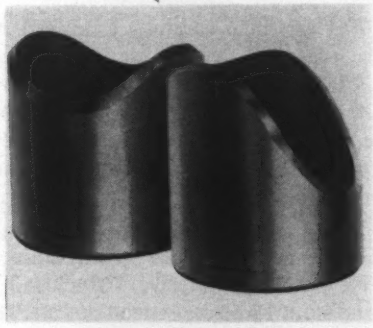
Reverse drivers make it possible to tap directly off of any spindle. However, their use is restricted to drill presses that are equipped with reversing motors. The 4 and 5 posi-

tion units are an economical way to convert most drill presses into precision drilling machines. (Chicago Quadrill Co.)

For more data circle No. 25 on postcard, p. 81

Pre-Shaped Fittings

Pre-shaped saddle fittings are now available in 45° angles. Made of high-strength seamless tubing in three weight schedules, the fittings can be delivered with mill test certificates if requested. Sizes range from 1 to 12 in. for welding and 1



to 4 in. for threaded filling. All are beveled for welding. Special fittings 1 to 36 in. in aluminum, alloy or stainless steel are available in any desired angle. (Allied Piping Products Co., Inc.)

For more data circle No. 26 on postcard, p. 81

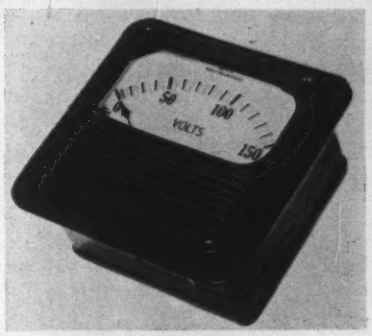
Push-Pull Gage

A versatile instrument does the work of two separate compression- and tension-measuring devices. Its split-dial gives readings of compression and tension loads. Also, it can be hooked into a system to measure and control oscillating loads in both compression and tension. (W. C. Dillon & Co.)

For more data circle No. 27 on postcard, p. 81

Electrical Instruments

New 100° ac ammeters and voltmeters use a taut-band suspension system. These self-contained units are available from 0.005 to 75 amp and from 5 to 800 v. They replace the manufacturer's instruments that use pivot and jewel bearings and air - chamber damping. Taut - band construction eliminates rolling and sliding friction. This enables the in-

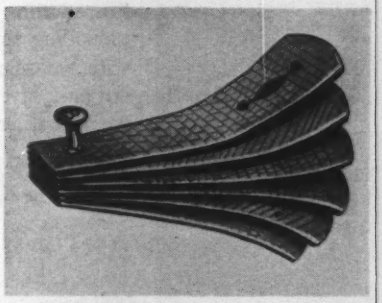


struments to withstand severe shock without affecting their accuracy. (Westinghouse Electric Corp.)

For more data circle No. 28 on postcard, p. 81

Detachable Belting

To keep pace with increased demands from industrial customers, a manufacturer offers improved detachable V-link belting. This new belting is made with synthetic-blended-filament yarns. Tests and actual on-the-job use prove this belting increases horse-power rat-



ings, adds longer life and reduces stretch and vibration. (The Brammer Corp.)

For more data circle No. 29 on postcard, p. 81

"the HITCHINER way..."

saves 35 MACHINING OPERATIONS with INVESTMENT CASTING

This barrel of a .22 caliber target revolver is now being cast by Hitchiner's new ceramic shell process. This new investment casting technique provides sufficient close tolerances and finishes to eliminate the need for 35 machining operations. Gun barrel tolerance of 0.006 inch was normal, but plus over minus 0.001 inch was maintained on certain areas. Only external finishing needed was partial polishing.

These savings have allowed the manufacturer of this revolver to sell it for considerably less than a similar previous model.

Through investment casting, parts can be designed for function and maximum operating efficiency with the widest selection of alloys from which to choose. This freedom from manufacturing problems can result in more flexibility in design and less waste in production.

Send us a sample or blueprint and check your specific problem with our "engineered quotation" — no obligation, of course.

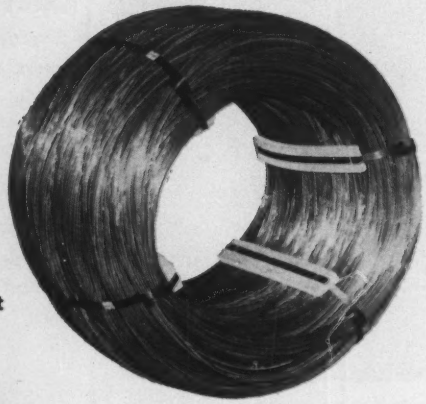
Find out how our new ceramic shell technique can possibly benefit you. Send for our free, new revised brochure explaining investment castings.

HITCHINER
MANUFACTURING COMPANY INC.
MILFORD 36, NEW HAMPSHIRE

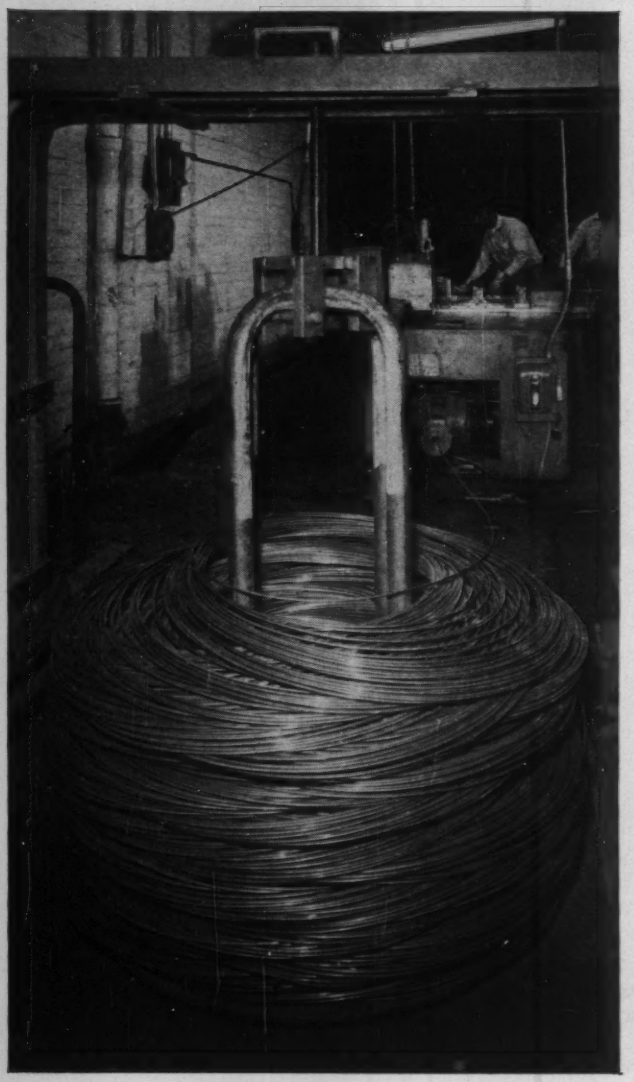
Coast to Coast Engineering Representatives

CF&I WIRE HELPS

PACKAGED for YOUR PRODUCTION



Compact shaped coil ready for shipment



"CF&I shaped coils have saved us 25% in storage, 20% in downtime, have increased our production by over 20%, and have enabled us to produce a higher quality product."—said Mr. Sol Lipshitz, president of Reforce Steel and Wire Corp., Brooklyn, New York.

Problem: "Previously with small coils, we had to stop our machine every 25 minutes to butt-weld the end of a new coil to the used-up coil. As we had to go to this trouble twenty times a day, we were losing 1½ to 2 hours daily in downtime," explained Mr. Lipshitz.

Solution: "A CF&I salesman carefully examined our operation; then he suggested that we use CF&I shaped coils which hold 2500 pounds of continuous length wire, as opposed to 200 or 300 pounds. As a result, we now stop our machine only once to start a new coil, instead of 10 times every day. We save nearly two hours, and have increased production by 20%.

"In addition, CF&I shaped coils have greatly reduced unloading time. Now when we receive a truckload of wire, we unload and store 15 pieces instead of 200. This not only saves time, but freight expenses as well because we now store much more and have to order one-fifth as often."

CF&I heavy coil mounted on spider for pay-off. This heavy coil contains 2500 pounds of continuous length of wire—enough wire for one-half day's production at the Reforce Steel and Wire Corp. "By virtually eliminating downtime with these heavy coils, we have increased production by 20%," said Reforce's president.

CUT DOWNTIME 20%

at Reforce Steel and Wire Corporation, Brooklyn, N. Y.

Heavy coils are quickly and easily placed on a revolving spider. The spider, which is leased from Wickwire, acts like a spool and assures smooth, even pay-off. "Because our machine jerks rather than drawing steadily, the small coils frequently pulled over and became tangled," explained Mr. Lipshitz. "CF&I heavy coils on spiders give us a steady flow of wire and make our operation more uniform."

Here you see some of Reforce's finished reinforcing accessories. "CF&I heavy coils have increased the quality of our product," said Mr. Lipshitz. "Small coils require frequent coil end welding. Sometimes, due to different coil melting temperatures, our automatic welding machine failed to make a good bond, forcing us to re-weld some faulty joints. CF&I long length coils have eliminated this problem."

Choose the CF&I wire package that offers one or more of the following benefits for your production:

- **less downtime with extra-long lengths of wire**
- **quick unloading and easy in-plant handling**
- **simplified inventory control**
- **assured cleanliness of the wire**

Our salesman will be glad to study your operation and recommend the wire package that will save you time and money. Call the nearest CF&I office today to set up a "no obligation" appointment.

CF&I-WICKWIRE WIRE

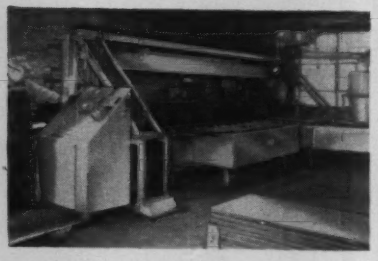
THE COLORADO FUEL AND IRON CORPORATION

In the West: **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Farmington (N. M.) Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Odessa (Tex.) • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City San Francisco • San Leandro • Seattle • Spokane • Wichita

In the East: **WICKWIRE SPENCER STEEL DIVISION**—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

CF&I OFFICE IN CANADA: Montreal • **CANADIAN REPRESENTATIVES AT:** Calgary • Edmonton • Vancouver • Winnipeg 6946

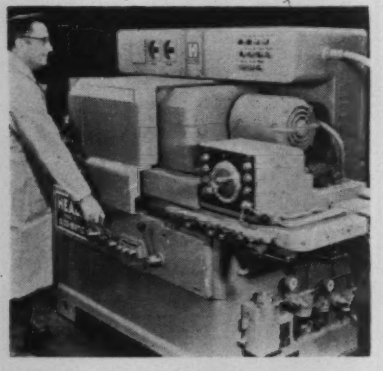
New Equipment and Machinery



Cutting Machine Cuts Plate in Lengths up to 12 Ft

A high-speed, traverse-type cutting machine handles stainless steel, and highly-abrasion-resistant plate with about 45-50 pct carbon. The thicknesses may vary from ¾-1½ in. A full 20-hp, continuous-duty induction motor powers the 20-in. dry cutting abrasive wheel. The machine cuts ¾-in. plate at the rate of 3-4 fpm. It is guaranteed to cut ±0.020 in. per 10 foot length of cut without change of characteristics or hardness. (Stone Machinery Co., Inc.)

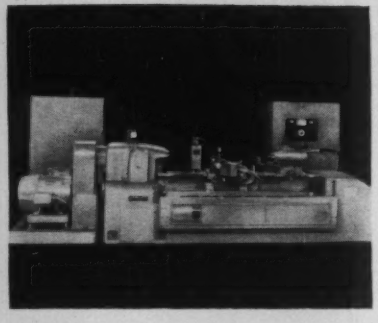
For more data circle No. 30 on postcard, p. 81



Grinder Offers Increased Workhandling Capacity

Impulse feeding makes possible straighter bores with smoother finishes, for long bore ratios, on an internal grinder. The grinder accommodates workpieces to 8-in. OD. Its angular capacity, takes work with a 90° included angle. Either constant or impulse feeding can be selected through the feed box. Infinitely variable compensation for wheel wear aids in maintaining tolerances and promotes longer wheel life. Carefully engineered for minimum maintenance, the grinder is also easy to operate. Core plates and hydraulic mechanisms are more accessible for easier service inspection. This machine gives a high rate of metal removal and reduced unit costs. (The Heald Machine Co.)

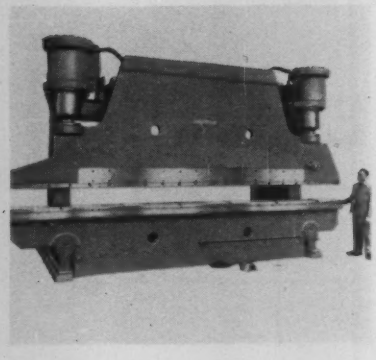
For more data circle No. 31 on postcard, p. 81



Production Lathe Finishes Shafts of Many Sizes

On a production basis, a lathe finishes multi-diameter shafts to precise accuracy and finish tolerances. Work diameter limit is 0.0002-0.0004 in., depending on length. The finish is 40 microinch or better. The drive consists of a 20-hp, 4:1 variable-speed dc motor, with all-electronic control. Standard spindle speed is 800-3200 rpm. Mist lubrication is provided for the bearings both in the headstock and the tailstock. A system of gaging and automatic tool adjustment compensates for tool wear and makes allowance for human error. Feed range is infinitely variable from 2½-20 ipm. (The Monarch Machine Tool Co.)

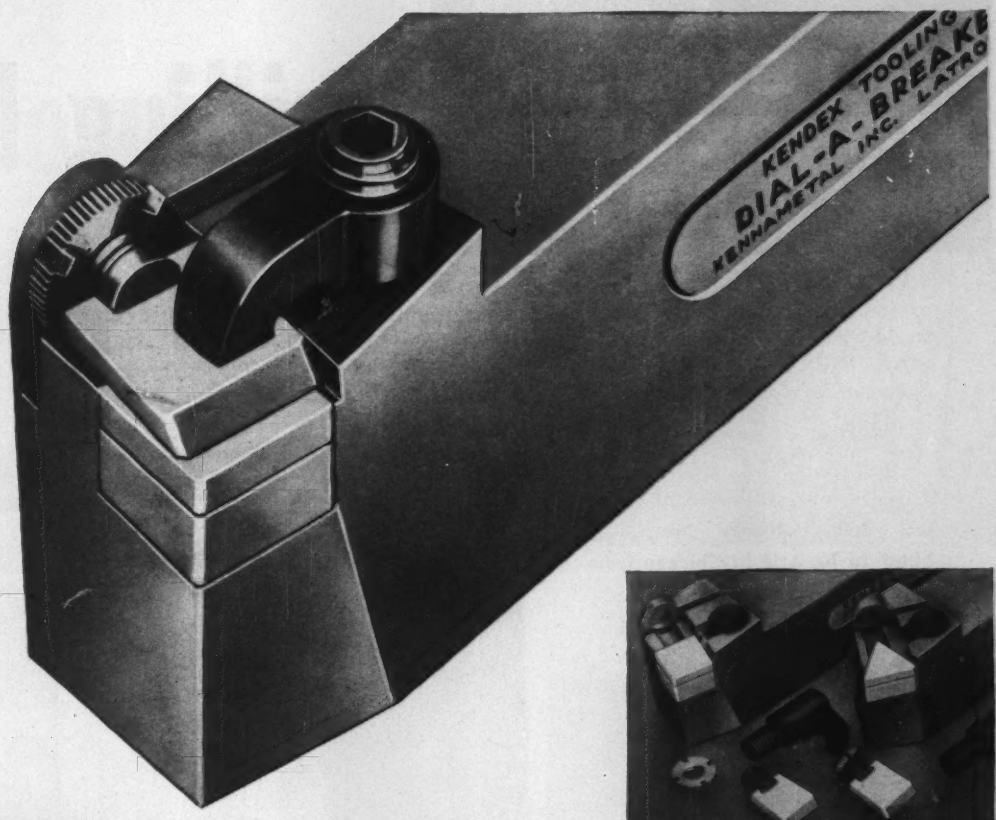
For more data circle No. 32 on postcard, p. 81



Press Brake's Stroke Adjusts to Any Length

Unable to be overloaded, a hydraulic press brake has a deep bed extending 36 in. below the floor. This insures minimum deflection and accurate bends. Rated at 650 tons at mid-stroke, the press brake has an over all bed length of 20 ft-3 in. Distance between housings is 14 ft-4 in. The machine has a long stroke of 16 in. This is advantageous for deep bending and drawing work. The power is constant for the entire stroke. The press has three operating speeds. A simple turn of a knob changes the tonnage or operating pressure to suit the work. Regardless of where the work is placed along the bed, the ram will remain level or at any taper at which set. (The Cleveland Crane & Engineering Co.)

For more data circle No. 33 on postcard, p. 81



NEW KENDEX*
DIAL-A-BREAKER*
Easily adjustable . . . attached chipbreaker

Quickly, easily . . . set the chipbreaker where you want it, regardless of holder position. The new Kendex Dial-A-Breaker eliminates fumbling and fussing while changing and adjusting chipbreakers and inserts. Chipbreaker is brazed to its adjustment screw. *It can't fall out, and the breaker setting may be retained while indexing or changing inserts.*

You no longer need a different breaker for every cutting job. Now you just turn the dial and position one chipbreaker for *several* jobs. Minimum of parts to stock . . . only two chipbreakers required for 70 styles and sizes of holders.

Close ganging of tools presents no adjustment problems with the Kendex Dial-A-Breaker. *All* changes and adjustments . . . chipbreaker and insert . . . can be made from the top of the holder. (The clamp screw is also accessible from the bottom of the tool when mounted in an inverted position on the rear carriage.)

Kendex Dial-A-Breaker Tool Holders have the same basic design and accommodate the same solid Kennametal shims and "throw-away" inserts as used in standard Kendex holders. They are available in positive or negative rake, and with square or triangular inserts.

Get more information. Ask your Kennametal Representative for a demonstration . . . or write KENNAMETAL INC., Latrobe, Pa. 33801

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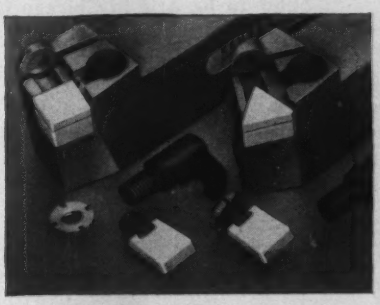
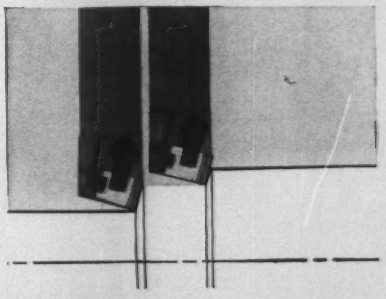
Booth 1500 • Adjacent to Restaurant
PRODUCTION ENGINEERING SHOW
Navy Pier • Booth 111



Holders illustrated with clamps and chipbreakers removed show positive seating of both triangular and square inserts. When not required, tool may be used without chipbreaker, with clamp set directly on the insert.



Easily accessible for adjustments. Permits close ganging of tools.

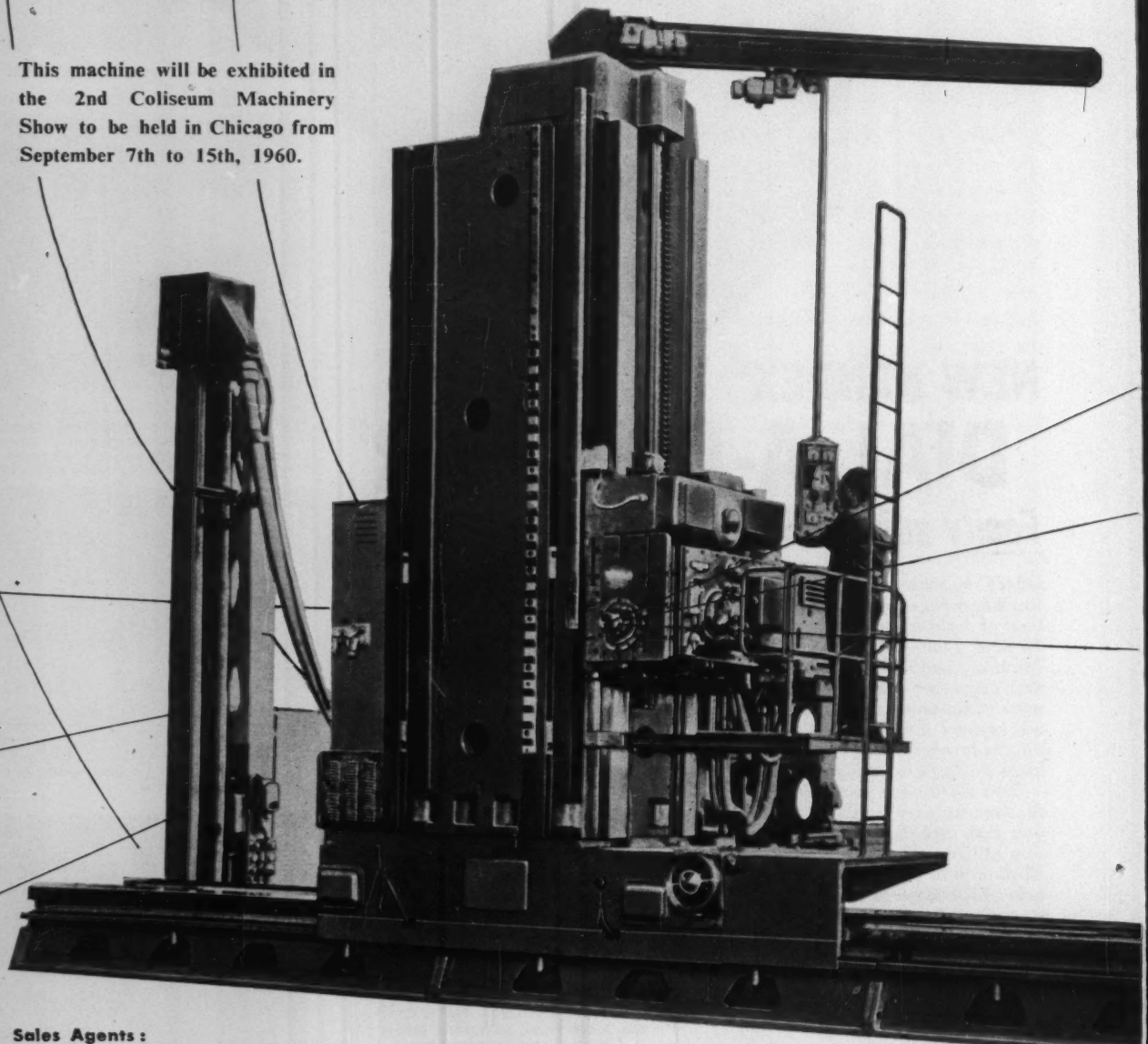
Easy adjustment, regardless of tool position. Just release the clamp and "dial" the breaker to any position desired.

MITSUBISHI INNOCENTI CWB

milling boring

MITSUBISHI ZOSEN KABUSHIKI KAISHA (Mitsubishi Shipbuilding & Engineering Co., Ltd.) take pleasure in announcing the conclusion of a license agreement with INNOCENTI S.G. of Milano for the manufacture and world-wide distribution of the universally known INNOCENTI-CWB MILLING, BORING & COMBINED MACHINES. The machines will be produced in Floor Type, Planer Type and other Combination Types, the diameters of spindles being 140 mm for milling and 95 mm for boring.

This machine will be exhibited in the 2nd Coliseum Machinery Show to be held in Chicago from September 7th to 15th, 1960.



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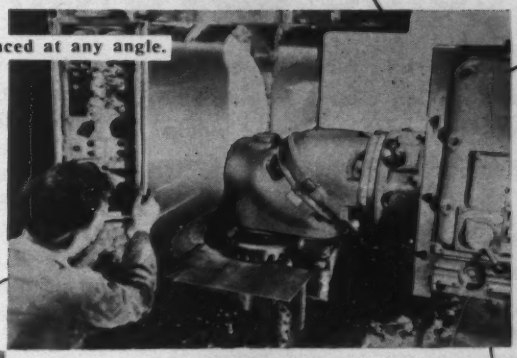
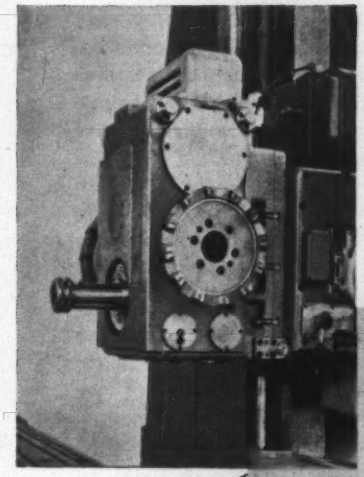
Melbourne : Mitsubishi (Australia) Pty., Ltd., Melbourne Office, 1st Floor, Houghton House, 543 Little Collins St., Melbourne, C. 1, Victoria

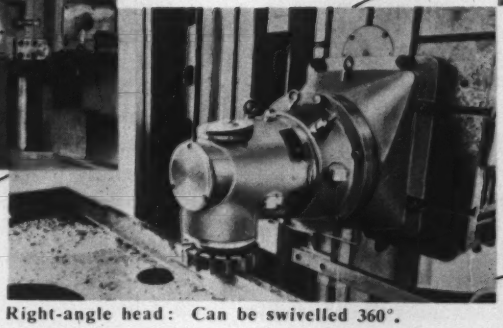
and combined machines

Universal head: Can be placed at any angle.



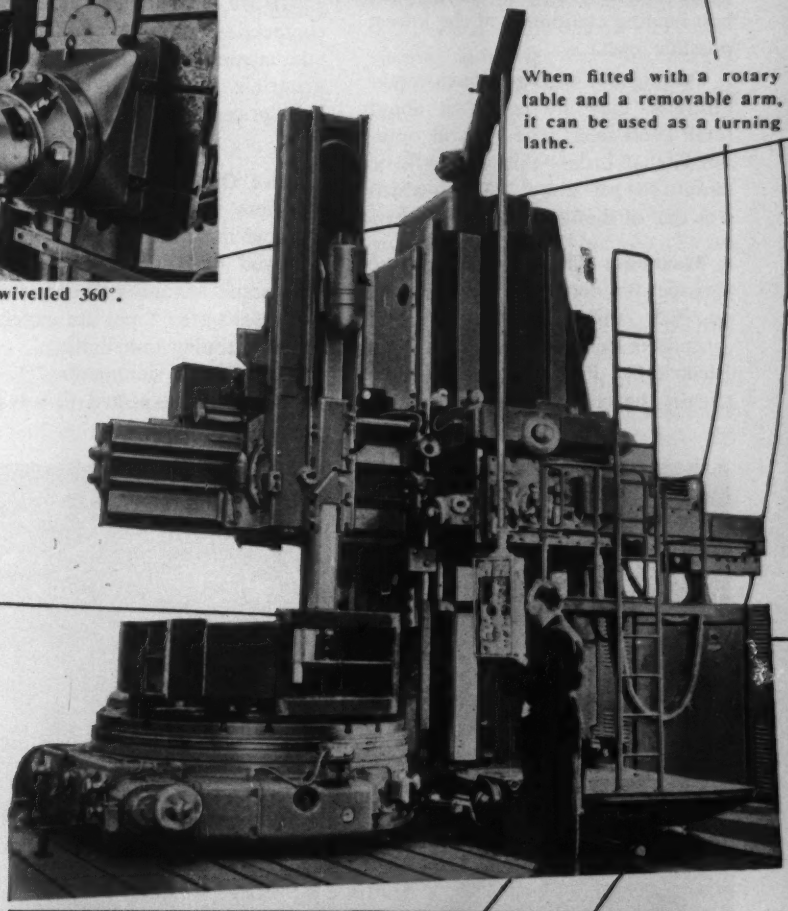


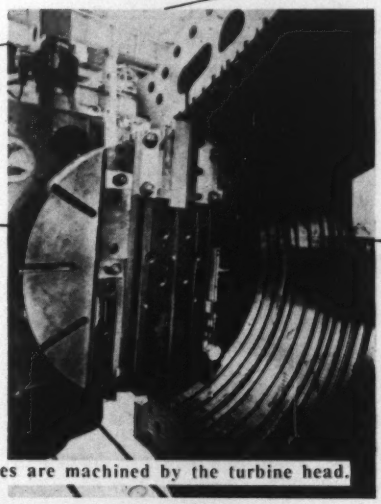
Milling can be done on three faces by the three way head.



Right-angle head: Can be swivelled 360°.

When fitted with a rotary table and a removable arm, it can be used as a turning lathe.





Grooves are machined by the turbine head.

MITSUBISHI ZOSEN

(MITSUBISHI SHIPBUILDING & ENGINEERING CO. LTD)

Head Office: Marunouchi, Tokyo, Japan

Machine Tool Manufacturing Division:

HIROSHIMA PRECISION MACHINE WORKS

Hiroshima, Japan

Furnace Makers Push Service

Industrial furnace builders are making efforts to give buyers the most advanced equipment while keeping costs down.

Right now they are holding the line on prices, but some increases are probable later on.

■ Industrial furnace makers are going all-out to give buyers the best heating equipment at the lowest possible cost.

Despite the current slowdown in business, they are confident about total 1960 sales. The general opinion is that orders this year will be about 15 pct above 1959—which was one of the industry's best years.

Maximum Thought — But the furnace builders are not coasting on their ability. Typical of their attitude is this comment from Ajax Electric Co. Phila., makers of electrically heated industrial furnaces.

"We review each order as it comes in to see if we can't build a more efficient, economical unit. This applies even on repeat orders where the customer is satisfied with the previous equipment.

"In one case we recommended a change in specifications that saved the customer money, even after he had ok'ed the original purchase order.

"If we did not re-evaluate the engineering on our equipment to take advantage of new methods and materials, we would not be able to hold prices steady—as we have so far."

Price Outlook—On the question of prices, manufacturers are trying to avoid increases. But the majority surveyed by The IRON AGE believe some advances are inevitable. Increases up to 5 pct are expected, with the timing indefinate.

Some typical comments:

"Prices are expected to advance although the 5 pct we previously expected has not yet materialized. There are some supplier increases going through now. When the pressure becomes great enough we will have to raise our prices."

"We look for an increase of approximately 5 pct."

"The outlook on prices is an upward creep."

Delivery Promises—Order backlogs for the manufacturers are varied. Some report them above 1959 levels, others say they are about the same (or lower) compared with this time a year ago.

Generally, buyers can count on getting normal deliveries or better. In a few cases deliveries are starting to stretch out.

Here are a few specific comments on delivery:

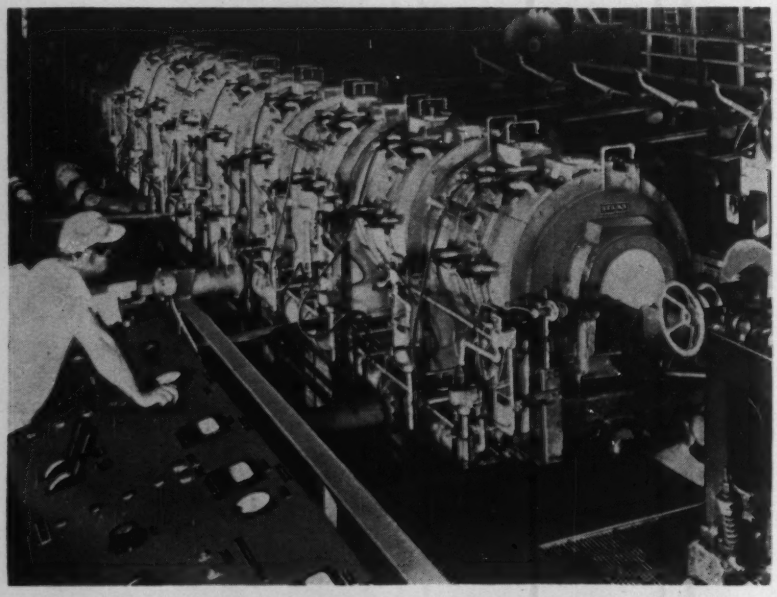
"Our delivery on furnaces would range between five to six months, and on our specialized equipment eight to ten months."

"Deliveries are about 12 weeks for standard enclosed quench furnaces, 8 to 10 weeks for atmosphere generators and 16 to 20 weeks on engineered units with automation. We can quote 6 weeks on small standard furnaces in many cases."

Design Trends — New developments in furnace design are aimed at pushing back the twin frontiers of heat treating—temperature and pressure. The Drever Co., Bethayres, Pa., comments: "One new development will be equipment for heat treating alloy grades of structural materials.

"Another will be an increasing use of vacuum furnaces for processing metal parts. This will not be limited to the exotic types of materials where vacuum is a must.

"A third advance will be in electric furnaces where refractory lined equipment will be used to bright anneal stainless grades.



EMPHASIS ON AUTOMATION: In Selas Corp. reheat line for sizing of large tubing, operator controls only mechanical handling at discharge.

The Iron Age Summary

Seasonal Pickup Improves Sales

Slight increase in steel orders reflects seasonal buying against fall needs.

But continued lack of strong orders from automakers disappoints steel mills.

■ New orders for steel are starting to pick up along seasonal lines.

But, at the same time, reports from automakers are not good. There have been some downward adjustments of production schedules and some cutbacks in advance orders from Detroit.

Without a continuing upsurge of auto business, steel operations in November will be lower than October. October now shapes up as the best month of the second half, following a disappointing September when business is not improving as expected.

Signs of Improvement — These developments in market improvement are noted:

Miscellaneous steel business is picking up.

Total new order volume is improving, although moderately. The last two weeks have been the best in many months.

Volume of rush orders is up, indicating many users have inventories at a low level—or at least out of balance with spot shortages.

Pipeline tonnage is up with the release of a number of projects.

Operating Outlook — While the rate of new business is up, industry people are more realistic in their estimates of the market. Most steel companies now believe the third quarter will average about 50 pct of capacity with the fourth quarter averaging slightly under 70 pct.

The rate may reach 75 to 80 pct in October, before dropping back in November.

The situation in Detroit is puzzling steelmakers. The order rate from automakers is not up to expectations. And setbacks of delivery and cutbacks of size of some orders has already occurred.

Buyer Caution — This picture could change in a hurry. But apparently there is some apprehension about sales of early 1961 cars. This is reflected in caution against overordering in October and November.

Automakers, well aware that with the operating rate languishing in the 50's, the steel industry will have no trouble producing steel if it's needed for an auto production surge.

Furthermore, auto steel orders have held up relatively well even through the decline in overall business. It is other major steel-consuming industries that are mostly responsible for the recession in steel.

Ordering Erratic—The day-to-day order rate has been erratic. The daily volume of new business has varied from 30 pct of capacity to almost 80 pct.

But, with each false start, the order volume has picked up slightly from the previous low. Even so, the "best two weeks in months" reported by a major steel company is high enough to sustain only 55 pct of capacity.

For the short term, railroad labor troubles threaten to result in deviations of the pattern of business.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	1,533	1,547	1,537	332
Ingot Index				
(1947-1949=100)	95.4	96.3	95.7	20.7
Operating Rates				
North East Coast	56.0	60.0*	58.0	12.0†
Buffalo	58.0	58.0*	56.0	0.0†
Pittsburgh	45.0	45.0*	49.0	25.0†
Youngstown	44.0	45.0*	47.0	10.0†
Cleveland	53.0	50.0	46.0	0.0†
Detroit	71.0	75.0*	78.0	24.0†
Chicago	60.0	58.0*	56.0	5.0†
Cincinnati	60.0	60.0*	55.0	63.0†
St. Louis	73.0	70.0*	54.0	87.0†
South	61.0	60.0	61.0	12.0†
West	51.0	53.0	48.0	0.0
U. S. Rate	53.8	54.3	53.9	11.7

*Revised †IRON AGE Estimates

Source: American Iron and Steel Institute

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.41	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$32.50	$32.50	$31.83	$41.17
No. 2 bundles	$22.83	$22.17	$21.50	$27.67
Nonferrous				
Aluminum ingot	26.00	26.00	28.10	26.80
Copper, electrolytic	33.00	33.00	33.00	30.00
Lead, St. Louis	11.80	11.80	11.80	12.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	102.25	101.625	104.625	102.50
Zinc, E. St. Louis	13.00	13.00	13.00	11.00

Structurals Show Slight Pickup

Shipments of fabricated structural steel in July were second highest for this year.

And industry backlog indicate business will hold at good levels through November.

■ Fabricated structural steel shipments in July were the second best monthly total for this year. And backlogs indicate that business should remain good for at least four months, according to the American Institute of Steel Construction.

Steel deliveries for the month totaled 301,249 tons, up 26 pct from the 238,559 tons shipped in strike-hampered July a year ago. Only June shipments of 332,694 tons were higher. Total shipments during the first seven months of 1960 were 1,932,264 tons. This was 2 pct greater than in the same year ago period.

Orders Increase — New orders during July totaled 270,198 tons, slightly better than the previous month and 4 pct better than a year ago. Total bookings in the first seven months showed a 7 pct increase, up 135,000 tons from the same period in 1959 to 2,005,899 tons.

Industry backlog stood at 2,203,253 tons at the end of July. Of this, 57 pct or 1,257,676 tons are scheduled for fabrication by the end of November.

One area that may help is road-building, which has received a fresh infusion of funds since the beginning of the new fiscal year. While it is fairly late in the season for new programs to have much of an impact, they could be enough to sustain present levels of business.

Sheet and Strip—Automotive orders for hot- and cold-rolled sheet and strip are mainly concentrated in the **Detroit** and **Cleveland** districts. September orders have shown only slight improvement along the **East Coast,** but mills are still able to promise delivery within two to three weeks. There's no evidence of an improvement for either September or October reported by **Pittsburgh** mills. However, a decided improvement is noticed in **Cleveland.** Stampers and fastener manufacturers are getting releases from automakers; these are being turned into orders for September and October. A similar situation prevails at **Detroit,** but not all steelmakers are sharing equally. In part, it depends on which steelmaker supplies what automaker. For one thing, some stretchouts of orders already placed could be coming. And, automotive purchases of sheet and strip declined again last week in **Chicago** which has yet to experience the upsurge in auto buying.

PURCHASING AGENT'S CHECKLIST

Licensing agreements open door to foreign markets. P. 37

With market prospects for scrap dim, many dealers are going into new lines. P. 40

New folded metal offers good design possibilities. P. 59

Galvanized — This market remains strong. Orders from construction and automotive industries have helped keep mill operations near capacity. And the industry reports that shipments of galvanized sheets to the appliance industry will total about 130,000 tons this year. This would be a 50 pct increase in appliance usage since 1954. Part of the increase is accounted for by the increase in sales of small unit air conditioners which make extensive use of the material.

Wire — Collapse of automotive and appliance buying of industrial wire grades, strong in the first half of August, has left **Chicago** wire mills stranded. Some mills are down to about 20 pct of capacity. Apparently many users have larger inventories than was suspected earlier. For example, one large user said its inventory was 25 pct higher than normal. The company expected to have its inventory under control early in July; now it will continue paring through October. On top of this, fence material from Austria is moving into the large farm market of Minnesota. The area has already undergone an invasion of merchant wire products from Japan, Germany and Belgium.

Stainless—Much of the tonnage is still going on rush orders. One mill on the **East Coast** says orders for November and December are more plentiful than September tonnage. But this doesn't offer very much encouragement for the future, either. Mills are leery of deferments or cancellations later.

Warehouses—Steel service centers are still trying to get inventories under control. Nearly all grades and types of steel products are included in stock cutting by **Chicago** warehouses, for example. One warehouse says it has only placed 10 pct of its normal October order, but may not place much more if business doesn't improve. Customer buying at warehouses has been spotty—one day is big, the next produces nothing.

COMPARISON OF PRICES

(Effective August 30, 1960)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Aug. 30 1960	Aug. 23 1960	Aug. 2 1960	Sept. 1 1959
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tin plate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Aug. 30 1960	Aug. 23 1960	Aug. 2 1960	Sept. 1 1959
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.57
Foundry, South Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	11.00	11.00	11.00	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$31.50	$31.50	$30.50	$45.50
No. 1 steel, Phila. area	34.50	34.50	33.50	39.50
No. 1 steel, Chicago	31.50	31.50	31.50	38.50
No. 1 bundles, Detroit	29.50	29.50	29.50	38.50
Low phos., Youngstown	35.50*	37.50	34.50	45.50
No. 1 mach'y cast, Pittsburgh	47.50	47.50	47.50	52.50
No. 1 mach'y cast, Phila.	49.50	49.50	49.50	50.50
No. 1 mach'y cast, Chicago	47.00	47.00	46.50	60.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$32.50	$32.50	$31.83	$41.17
No. 2 bundles	22.83*	22.17	21.50	27.67
Coke, Connelsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.50-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	33.00	33.00	33.00	30.00
Copper, Lake, Conn.	33.00	33.00	33.00	30.00
Tin, Straits, N. Y.	102.25*	101.625	104.625	102.50
Zinc, East St. Louis	13.00	13.00	13.00	11.00
Lead, St. Louis	11.80	11.80	11.80	12.80
Aluminum, ingot	26.00	26.00	28.10	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

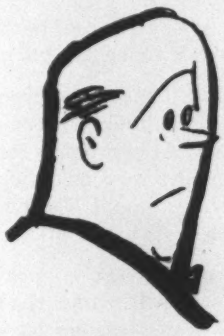
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.



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about personnel problems

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*Appears in the Aug. 25-Sept. 8 issues.

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Mill Inventories Are Still Holding

For some time scrap dealers have been optimistic about the business that "is bound to come our way."

Now they wonder if it will come. Prices remain firm, but the probability of slackening exports looms larger than ever.

■ Scrap dealers and brokers are losing optimism about "the business that's bound to come soon." They aren't sure it's going to come.

One dealer puts it this way: "When tonnage and prices dropped this spring, the word was that August would bring an upswing. In August, the talk was for September . . . then October. Now it's November."

More and more scrapmen are studying the market with a "tomorrow will never come" attitude. Mills are drifting along with very little buying. Dealers wonder if mill inventories will diminish and create a demand. Mills are quiet on the matter.

So far this year, exports have sustained the market. However rumors of a fourth quarter cutback persist. A spokesman for the Institute of Scrap Iron and Steel concedes these reports are "probably true."

Prices in St. Louis, which had been rising, moved sideways this week. Chicago reports an air of uncertainty and the Philadelphia market is quiet. Exports have slowed in several key areas, but New York and Boston report a firm export market.

Pittsburgh—The market continues to reflect potential strength but no new activity. An eastern purchase of No. 2 bundles has cut off truck shipments of that grade into the district. With higher prices already in effect to the west, district demand must be met from local supply. The small amount of scrap being bought by mills can be purchased locally.

Chicago — Without any great change in prices, a note of uncertainty is creeping into the Chicago market. At least two bundle bids were withdrawn and some yards are beginning to slow down on buying. No surge of short sales is reported and dealer prices continue firm.

Philadelphia—A local mill recently purchased No. 2 bundles at a higher price. Otherwise, activity is very small. One broker believes mills are eating into inventories and a rise in business will mean "a tightening of prices." A dealer feels "lower prices are out of the question." Generally the feeling is that mills are drifting along and must soon place substantial orders.

New York—A small buy of No. 2 bundles in an adjacent area confirms the current level of steelmaking grades. Other than this, the domestic market is still nil. Exports, however, are holding up well. Some dealers think the fourth quarter may be the best of the year. They are basing appraisals almost solely on export business.

Detroit—Early closing industrial lists for September indicate a market softness. Dealers show no anxiety to buy off the lists. Scrap output by automakers should be slightly higher this month, with a greater rise coming in October. The only recent sales have been for No. 2 bundles and a small amount of foundry steel.

Cleveland—Auto list tonnage is up to nearly 25,000 tons for September. This is more than the market can absorb immediately. The dealer market expects no new activity until after Labor Day. The price of No. 1 machinery cast was incorrectly quoted last week. It should have read $50 to $51.

Cincinnati—The outlook is for a continued quiet market in September with only minor price changes. Mills have ample inventories and aren't eager to take more. Cast is moving south to pipe plants.

St. Louis—The market continues to drift along on a more-or-less even keel. At present prices, scrap is not too hard to sell. But demand is far from brisk. Dealers continue to express disappointment at the slow rate of increase.

Birmingham — Prices generally are unchanged. Nevertheless, brokers say the market looks stronger. This is because of growing shortages, particularly in foundry grades. An Atlanta mill bought No. 2 heavy melting at $32 per ton, which is $7 above the Birmingham price.

Buffalo—Prices are unchanged. However activity is increasing somewhat. Several new orders for openhearth grades were made for delivery later this month. The purchases were made at current prices.

Boston — Export is picking up and the domestic market has firmed. Primary grades are up $1 on the strength of increased export.

West Coast—Prices are soft as export continues at a slow rate. Mills have large inventories. Some dealers believe mills might stay out of the market until November.

Houston — The market remains unchanged with domestic operations on the quiet side. Export continues to show some firmness. Intake is off considerably because of bad weather. One dealer-broker reports his purchases are 25 pct lower than normal.

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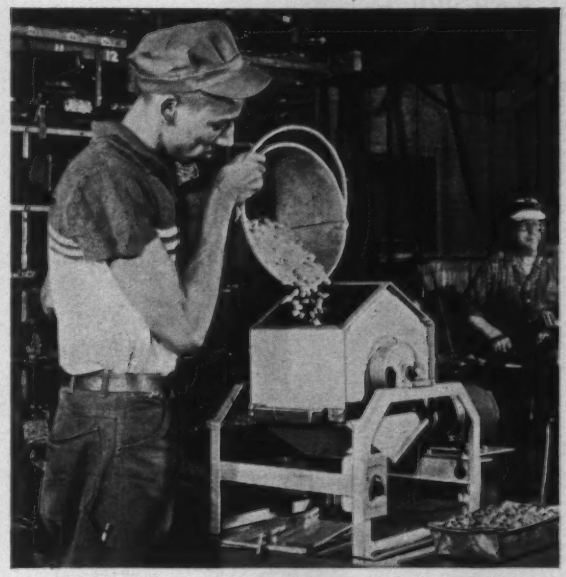

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SCRAP PRICES *(Effective August 30, 1960)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade, by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	32.00 to 33.00
No. 1 factory bundles	38.00 to 39.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	31.00 to 32.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	19.00 to 20.00
Low phos. punch'gs plate	38.00 to 39.00
Heavy turnings	27.00 to 28.00
No. 1 RR hvy. melting	37.00 to 38.00
Scrap rails, random lgth.	46.00 to 47.00
Rails 2 ft and under	50.00 to 51.00
RR specialties	47.00 to 48.00
No. 1 machinery cast	47.00 to 48.00
Cupola cast	38.00 to 39.00
Heavy breakable cast.	36.00 to 37.00
Stainless	
18-8 bundles and solids	185.00 to 190.00
18-8 turnings	95.00 to 100.00
430 bundles and solids	90.00 to 95.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	32.00 to 33.00
No. 1 factory bundles	37.00 to 38.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	31.00 to 32.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos. forge crops	42.00 to 43.00
Low phos. punch'gs plate, ¼ in. and heavier	38.00 to 39.00
Low phos. 2 ft. and under	36.00 to 37.00
No. 1 RR hvy. melting	35.00 to 36.00
Scrap rails, random lgth.	42.00 to 43.00
Rerolling rails	53.00 to 54.00
Rails 2 ft. and under	48.00 to 49.00
Angles and splice bars	43.00 to 44.00
RR steel car axles	50.00 to 51.00
RR couplers and knuckles	40.00 to 41.00
No. 1 machinery cast.	46.00 to 48.00
Cupola cast	41.00 to 42.00
Cast iron wheels	32.00 to 33.00
Malleable	45.00 to 46.00
Stove plate	34.00 to 36.00
Steel car wheels	39.00 to 40.00
Stainless	
18-8 bundles and solids	175.00 to 180.00
18-8 turnings	85.00 to 90.00
430 bundles and solids	85.00 to 90.00
430 turnings	40.00 to 50.00

Philadelphia Area

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	14.00 to 15.00
Mixed bor. short turn.	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	20.00 to 21.00
Clean cast. chem. borings	23.00 to 24.00
Low phos. 5 ft and under	37.00 to 38.00
Low phos. 2 ft punch'gs	39.00 to 40.00
Elec. furnace bundles	36.00 to 37.00
Heavy turnings	27.00 to 28.00
RR specialties	39.00 to 40.00
Rails, 18 in. and under	51.00 to 52.00
Cupola cast	38.00 to 39.00
Heavy breakable cast.	39.00 to 40.00
Cast iron car wheels	40.00 to 41.00
Malleable	45.00 to 46.00
No. 1 machinery cast	49.00 to 50.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$26.50 to $27.50
No. 2 hvy. melting	22.50 to 23.50
No. 1 dealer bundles	26.50 to 27.50
No. 2 bundles	17.50 to 18.50
Machine shop turn.	10.00 to 11.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Low phos. 18-in. and under	35.00 to 36.00
Rails, random length	42.00 to 43.00
Rails, 18 in. and under	50.00 to 51.00
No. 1 cupola cast	37.00 to 38.00
Hvy. breakable cast.	31.00 to 32.00
Drop broken cast.	49.00 to 50.00

Youngstown

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	19.00 to 20.00
Low phos. plate	35.00 to 36.00

Cleveland

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	22.50 to 23.50
No. 1 dealer bundles	31.00 to 32.00
No. 1 factory bundles	33.50 to 34.50
No. 2 bundles	19.00 to 20.00
No. 1 busheling	31.00 to 32.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Cut structural & plates, 2 ft. & under	37.00 to 38.00
Low phos. punch'gs plate	32.00 to 33.00
Drop forge flashings	31.00 to 32.00
Foundry steel, 2 ft. & under	34.00 to 35.00
No. 1 RR hvy. melting	34.50 to 35.50
Rails 2 ft. and under	49.00 to 50.00
Rails 18 in. and under	50.00 to 51.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	47.00 to 48.00
No. 1 machinery cast.	50.00 to 51.00
Stove plate	39.00 to 40.00
Malleable	45.00 to 46.00
Stainless	
18-8 bundles	180.00 to 185.00
18-8 turnings	75.00 to 80.00
430 bundles	80.00 to 85.00

Buffalo

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 busheling	29.00 to 30.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	14.00 to 15.00
Low phos. plate	36.00 to 37.00
Structurals and plate, 2 ft. and under	38.00 to 39.00
Scrap rails, random lgth.	37.00 to 38.00
Rails 2 ft. and under	47.00 to 48.00
No. 1 machinery cast.	46.00 to 47.00
No. 1 cupola cast	40.00 to 41.00

St. Louis

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	28.00 to 29.00
Foundry steel, 2 ft.	31.00 to 32.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	8.00 to 9.00
Shoveling turnings	10.00 to 11.00
Cast iron borings	21.00 to 22.00
No. 1 RR hvy. melting	34.00 to 35.00
Rails, random lengths	40.00 to 41.00
Rails, 18 in. and under	42.00 to 43.00
RR specialties	39.00 to 40.00
Cupola cast	42.00 to 43.00
Heavy breakable cast.	35.00 to 36.00
Stove plate	36.00 to 37.00
Cast iron car wheels	35.00 to 36.00
Rerolling rails	52.00 to 53.00
Unstripped motor blocks	36.00 to 37.00

Birmingham

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	31.00 to 32.00
Machine shop turn.	17.00 to 18.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	9.00 to 10.00
Electric furnace bundles	32.00 to 33.00
Elec. furnace, 3 ft. & under	32.00 to 33.00
Bar crops and plate	38.00 to 39.00
Structural and plate, 2 ft.	37.00 to 38.00
No. 1 RR hvy. melting	30.00 to 31.00
Scrap rail, random lgth.	39.00 to 40.00
Rails, 18 in. and under	45.00 to 46.00
Angles and splice bars	38.00 to 39.00
No. 1 cupola cast.	46.00 to 47.00
Stove plate	46.00 to 47.00
Cast iron car wheels	38.00 to 39.00
Unstripped motor blocks	34.00 to 35.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	21.00 to 22.00
No. 2 dealer bundles	16.00 to 17.00
Machine shop turnings	7.00 to 8.00
Mixed bor. and turn.	9.00 to 10.00
Shoveling turnings	10.00 to 11.00
Clean cast. chem. borings	18.00 to 19.00
No. 1 machinery cast.	37.00 to 38.00
Mixed yard cast.	33.00 to 34.00
Heavy breakable cast.	31.00 to 32.00
Stainless	
18-8 prepared solids	165.00 to 170.00
18-8 turnings	80.00 to 85.00
430 prepared solids	70.00 to 75.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	18.00 to 19.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	26.00 to 27.00
Drop forge flashings	26.00 to 27.00
Machine shop turn.	9.00 to 10.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	12.00 to 13.00
Heavy breakable cast.	30.00 to 31.00
Mixed cupola cast.	35.00 to 36.00
Automotive cast.	42.00 to 43.00
Stainless	
18-8 bundles and solids	170.00 to 175.00
18-8 turnings	60.00 to 65.00
430 bundles and solids	60.00 to 65.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$25.00 to $26.00
No. 2 hvy. melting	20.00 to 21.00
No. 1 dealer bundles	25.00 to 26.00
No. 2 bundles	14.00 to 15.00
No. 1 busheling	25.00 to 26.00
Machine shop turn.	5.00 to 6.00
Shoveling turnings	8.00 to 9.00
Clean cast. chem. borings	12.00 to 13.00
No. 1 machinery cast.	38.00 to 39.00
Mixed cupola cast.	32.00 to 33.00
Heavy breakable cast.	27.50 to 28.50

San Francisco

No. 1 hvy. melting	....	$34.00
No. 2 hvy. melting	....	30.00
No. 1 dealer bundles	....	30.00
No. 2 bundles	....	20.00
Machine shop turn.	$14.00 to	15.00
Cast iron borings	14.00 to	15.00
No. 1 cupola cast.	....	46.00

Los Angeles

No. 1 hvy. melting	....	$32.00
No. 2 hvy. melting	....	29.00
No. 1 dealer bundles	....	27.00
No. 2 bundles	....	17.00
Machine shop turn.	....	13.00
Shoveling turnings	....	15.00
Cast iron borings	$15.00 to	16.00
Elec. furnace 1 ft. and under (foundry)	42.00 to	43.00
No. 1 cupola cast.	....	44.00

Seattle

No. 1 hvy. melting	....	$35.00
No. 2 hvy. melting	....	33.00
No. 2 bundles	....	22.00
No. 1 cupola cast	....	36.00
Mixed yard cast.	....	36.00

Hamilton, Ont.

Brokers buying prices per net ton on cars:

No. 1 hvy. melting	....	$25.80
No. 2 hvy. melting cut 3 ft. and under	....	22.50
No. 1 dealer bundles	....	25.80
No. 2 bundles	....	19.00
Mixed steel scrap	....	16.00
Bush., new fact., prep'd	....	25.50
Bush, new fact., unprep'd	....	20.45
Machine shop turn.	....	12.00
Short steel turn.	....	12.00
Mixed bor. and turn.	....	12.00
Cast scrap	....	33.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	....	$32.00
No. 2 hvy. melting	....	29.00
No. 2 bundles	....	18.00
Machine shop turn.	....	12.00
Shoveling turnings	....	14.00
Cut structural plate 2 ft. & under	$40.00 to	41.00
Unstripped motor blocks	26.00 to	27.00
Cupola cast.	32.00 to	33.00
Heavy breakable cast.	25.00 to	26.00

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Copper Expansion Needed by 1965

One market analyst predicts a copper shortage unless the industry expands.

Another prediction: A stable price structure ranging from 28c to 33c per lb.

■ At first glance, there is apparent over-capacity in the copper industry for current market levels. Is that a short-term or longer-term condition?

According to Walter Gutman, market analyst for Stearns & Co., "The prospects for a substantial increase in copper consumption in the next decade appear excellent."

Special Report — The versatile Mr. Gutman, whose own market letters cover the wide range of subjects from art to automation, makes this observation in a new report on the copper industry.

Despite the apparent over-capacity, Mr. Gutman says: "The world may face one of its periodic copper shortages by 1965 unless presently announced plans for expansion of capacity are considerably increased.

"If U. S. demand remains as stagnant as it has been for another 13 years, and if foreign demand remains as dynamic—but no more so —copper consumption by 1973 will exceed seven million tons annually."

In a Dynamic Market—"If the U. S. economy became more dynamic during this period, and if some of the new nations or the formerly backward nations proceeded at an accelerated rate, the cry 'shortage,' which was screamed from the factory tops only a few years ago, would certainly revive."

Mr. Gutman expects world copper consumption this year to be about 4.38 million tons, a record despite some drop in the U. S. By 1970, he expects annual world consumption to be about 5.8 million tons, or about 50 pct over 1959.

New Capacity—"About 100,000 tons of new capacity will therefore be needed each year if 1970 demand projections are to be met, and this assumes no increase in shipments to Iron Curtain countries, which is by no means uncertain," Mr. Gutman comments.

The market analyst takes a mixed view of possible repercussions on world copper markets of current goings-on in the Congo.

"The new government of the Congo is likely to develop a direct interest of some type in the copper mines of the area," he notes.

To the Iron Curtain—Mr. Gutman states that rather than pour metal on world markets for quick income, the new Congo government will coordinate output to maintain the current stable and relatively high-price picture.

But Mr. Gutman tells The IRON AGE that he sees some danger of Congo copper, 8 pct of Free World capacity, channeled behind the Iron Curtain. This, he says, would cause a "sensational" change in the structure of world markets.

Prices Stable — On prices Mr. Gutman says, "Growth of consumption of this magnitude would seem to preclude a long-term decline in copper prices." He figures the copper price will range between 28¢ and 33¢ per lb in the foreseeable future, with the current 33¢ price holding at least through September and possibly through the year.

In calculating copper markets, Mr. Gutman suggests that several basic conditions be considered. He says it is highly unlikely that, over the foreseeable future, the industry will produce at capacity for even one full year.

Also, copper executives have indicated their determination to prevent wide price fluctuations that, in the long run, cost markets in the 1956-58 period.

He points out that "a preponderant share of the capacity is in the hands of large companies which are well-off financially and do not have to press metal on the market.

Another item: Mr. Gutman estimates Russia's output of copper at 510,000 tons per year, topped only by the U. S., Chile, and Northern Rhodesia.

Mr. Gutman is convinced that the rise of W. Europe industry will significantly change the entire copper market.

The European boom, he says, is eating up copper. At least one producer is having trouble filling its commitments in Europe.

Tin prices for the week: Aug. 24 —102.50; Aug. 25—102.375; Aug. 26—101.875; Aug. 29—102.25; Aug. 30—102.25.*
* Estimate

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	26.00	24.70	12/17/59
Aluminum ingot	28.10	26.80	12/17/59
Copper (E)	33.00	30-33	11/12/59
Copper (CS)	33.00	35.00	3/11/60
Copper (L)	33.00	31.50	11/6/59
Lead, St. L.	11.80	12.30	12/21/59
Lead, N. Y.	12.00	12.50	12/21/59
Magnesium ingot	36.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/8/58
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	13.00	12.50	1/8/60
Zinc, N. Y.	13.50	13.00	1/8/60

ALUMINUM: 99% Ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; **Other primary prices, pg. 104.**

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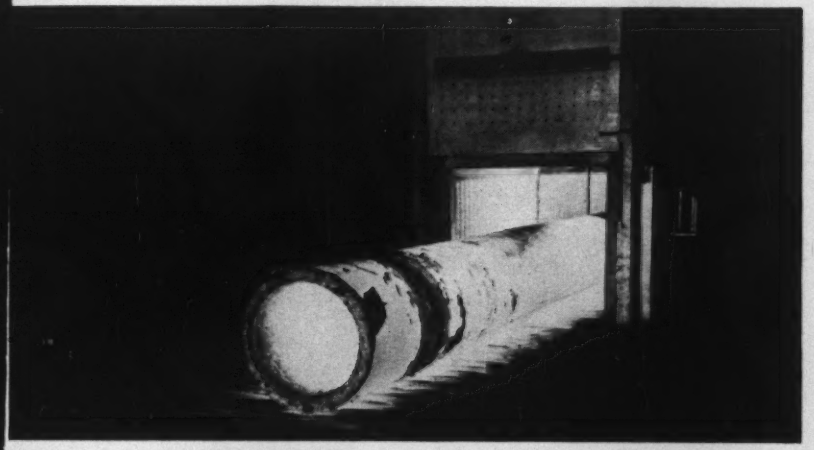
Hevi-Duty Electric Company, Milwaukee 1, Wis.



◀ Sandusky Foundry and Machine Company, Sandusky, Ohio, uses this Hevi-Duty car-bottom furnace to heat-treat castings up to 54 inches in diameter and 30 feet in length. Heating elements located in both ends, and in the car bottom, plus three fans, produce a degree of temperature uniformity generally expected only in smaller units. **For complete information, write for Bulletin 644R.**

▲ Pacific Steel Casting Company, San Francisco, California, is pleased with the operation of this Hevi-Duty Clean-Line Furnace. It heats, holds at the correct temperature for the prescribed period, transfers each load to the cooling chamber, and discharges baskets of castings automatically. A retractor on the unload table enables the Clean-Line Furnace to process four baskets without manual handling or supervision. Heat-treated castings come out ready for shipping without further attention. **For complete information on this, write for Bulletin D-100A.**

▲ Eaton Manufacturing Company's Valve Division really proves the ability of Hevi-Duty pit furnaces to maintain uniformity. They process dense 2,000-lb charges of valves — 10,000 to a load — all free from distortion, all uniformly hard . . . no rejects. An efficient fan and baffle system provides an even rate of heating throughout the dense load and contributes to over-all uniformity. **For complete information, send for Bulletin 646A.**

GOWN BY FON TAYNE; STAINLESS

stainless from creative Crucible

Crucible Stainless reflects beauty

Crucible stainless steel possesses its own beauty — a finish that is truly lustrous and gleaming. This finish is produced on the most modern mill equipment, by Crucible craftsmen, to exact processing specifications.

Add the beauty of Crucible stainless to your products — to reflect your products' quality. For samples of this remarkably fine finish — and engineering services that match it — call or write the nearest of Crucible's 35 local steel service centers.

CRUCIBLE

Stainless Steel

SHEET, STRIP, BAR AND WIRE BY CRUCIBLE STEEL COMPANY OF AMERICA, PITTSBURGH 30, PA.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("P" temper except 6061-0)

Alloy	.038	.048-.061	.077-.096	.136-.250
1100, 3003	47.8	47.3	46.2	45.1
5052	54.2	53.0	50.8	49.2
6061-0	51.0	49.8	47.9	46.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	44.7-46.2	53.2-60.8
18-32	45.2-46.8	57.7-79.9
33-38	48.8-51.4	83.3-94.5
39-44	58.7-62.4	99.9-121.0

Screw Machine Stock—2011-T-3

Size"	¼	⅜-⅝	¾-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	57.13	.....	54.86	58.32
Brass, Yellow	50.57	50.86	50.26	54.23
Brass, Low	53.53	53.82	53.22	57.09
Brass, R L	54.58	54.87	54.27	58.14
Brass, Naval	55.12	.....	48.68	58.78
Munts Metal	53.20	.....	48.26	.....
Momm. Bz.	56.17	56.46	55.86	59.48
Mang. Bz.	58.86	.....	52.21	.....
Phos. Bz. 5%	77.44	.....	78.10	.....

Free Cutting Brass Rod 36.06

TITANIUM

(Base prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $65.00
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.50
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base.... $ 1.31
Cobalt, 97-99% (per lb) ....$1.50 to $1.57
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 29.95 to 36.95
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9%, dollars per troy oz.. $2.25
Iridium, dollars per troy oz.....$75 to $85
Lithium, 98% .....$9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury, dollars per 76-lb flask f.o.b. New York .....$208 to $210
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz..$24 to $26
Platinum, dollars per troy oz...$82 to $85
Rhodium .....$137 to $140
Silver ingots (¢ per troy oz.)..... 91.375
Thorium, per kg. $43.00
Vanadium .....$ 3.65
Zirconium sponge .....$ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 29.25
- No. 120 ..... 28.25
- No. 123 ..... 27.25

80-10-10 ingot
- No. 305 ..... 33.75
- No. 315 ..... 31.50

88-10-2 ingot
- No. 210 ..... 42.00
- No. 215 ..... 38.75
- No. 245 ..... 34.00

Yellow ingot
- No. 405 ..... 23.75

Manganese bronze
- No. 421 ..... 28.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 25.25-25.50
- 0.60 copper max. 25.00-25.25

Piston alloys (No. 132 type)..27.00-28.00
No. 12 alum. (No. 2 grade)...23.75-24.25
108 alloy 24.25-24.75
195 alloy 26.75-27.75
13 alloy (0.60 copper max.)...24.75-25.00
AXS-679 (1 pct zinc) 24.00-25.00

(Effective Aug. 30, 1960)

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 24.75-25.75
Grade 2—92-95% 23.50-24.50
Grade 3—90-92% 22.50-23.50
Grade 4—85-90% 22.00-23.00

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28¼
Yellow brass	22¼	20¼
Red brass	25¾	25
Comm. bronze	26½	26
Mang. bronze	20¾	20
Free cutting rod ends.	21¼	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	27¾
No. 2 copper wire	26
Light copper	23¾
*Refinery brass	24
Copper bearing material	23

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	27½
No. 2 copper wire	26¾
Light copper	23¼
No. 1 composition	22
No. 1 comp. turnings	21¼
Hvy. yellow brass solids	16¾
Brass pipe	15
Radiators	17¾

Aluminum

Mixed old cast.	13½—14
Mixed new clips	14½—15½
Mixed turnings, dry	14 —14½

Dealers' Scrap

(Dealers' Buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	23½—24
No. 2 copper wire	21½—22
Light copper	19½—20
Auto radiators (unsweated)	13¼—13¾
No. 1 composition	18 —18½
No. 1 composition turnings	16½—17
Cocks and faucets	13¾—14¼
Clean heavy yellow brass	12¾—13¼
Brass pipe	14¼—14¾
New soft brass clippings	14½—15
No. 1 brass rod turnings	13¼—13¾

Aluminum

Alum. pistons and struts	7½— 8
Aluminum crankcase	9½—10
1100 (2s) aluminum clippings	12½—13
Old sheet and utensils	9½—10
Borings and turnings	5½— 6
Industrial castings	10 —10½
2020 (24s) clippings	12½—13

Zinc

New zinc clippings	7 — 7¼
Old zinc	4½— 5
Zinc routings	3¼— 3½
Old die cast scrap	2¾— 3

Nickel and Monel

Pure nickel clippings	52-54
Clean nickel turnings	40
Nickel anodes	52-54
Nickel rod ends	52-54
New Monel clippings	23-23.50
Clean Monel turnings	16.50-17
Old sheet Monel	22-23
Nickel silver clippings, mixed	18
Nickel silver turnings, mixed.	15

Lead

Soft scrap lead	8 — 8¼
Battery plates (dry)	3 — 3¼
Batteries, acid free	2 — 2¼

Miscellaneous

Block tin	79 —80
No. 1 pewter	59 —60
Auto babbitt	43 —44
Mixed common babbitt	10¼—10¾
Solder joints	14½—15
Siphon tops	41
Small foundry type	9¾—10¼
Monotype	9¾—10¼
Lino. and stereotype	8¾— 9
Electrotype	7½— 7¾
Hand picked type shells	5¼— 5¾
Lino. and stereo. dross	2¼— 2¾
Electro dross	2¼— 2¾

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Castle, Pa.									7.425* *M8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,13*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras.

(Effective Aug. 29, 1960)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* 1.25-lb. base box	Electro** 0.25-lb. base box	Hollowware Enameling 29 ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*	6.775 *B3*		7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W3*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

† Electrogalvanized sheets.

(Effective Aug. 29, 1960)

*7.425 at Sharon-Niles is 7.225

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,13*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,13, Y1*	5.675 *U1,13, Y1*	7.65 *R3,J3*	6.725 *U1,13, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,13, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,13*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*				7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U4, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, B5*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*				9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.25 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Aug. 29, 1960). * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brooke Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B.. Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M10 Mill Strip Products Co., New Castle, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore**	$.10	8.37	9.71	10.16	10.78	8.94	9.63	9.15	11.90	17.48	16.48	21.58	20.83
Birmingham**		8.46	10.20	10.69	9.45	8.41	8.47	8.26	13.14	16.76	.....	.....	.....
Boston**	.10	9.77	10.68	11.87	12.26	9.72	10.26	9.87	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	8.80	9.95	11.40	11.15	8.80	9.30	8.90	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.72	10.35	10.30	10.89	8.56	9.06	8.70	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	8.89	10.41	10.35	11.21	8.94	9.62	9.02	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.72[1]	10.13	11.39	11.01	8.80	9.45	8.81	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	.....	.....	.....	20.84
Detroit**	.15	8.98	10.61	10.65	11.26	8.93	9.62	9.01	11.16	17.38	16.38	21.48	20.73
Houston**		9.22	10.03	12.19[3]	10.78	8.95	8.86	8.63	13.10	17.50	16.55	21.55	20.85
Kansas City**	.15	9.36	11.02	11.50	11.02	9.25	9.95	9.46	11.72	17.17	15.87	21.87	21.12
Los Angeles**		9.59[1]	11.29	12.20	11.29	9.82	10.54	9.67	14.20	18.30	17.35	22.90	22.20
Memphis**	.15	9.99	10.20	.....	11.39	10.27	10.48	10.07	12.89	.....	.....	.....	.....
Milwaukee**	.15	8.86	10.49	10.44	11.03	8.70	9.28	8.84	11.04	17.24	16.24	21.24	20.49
New York	.10	9.46	10.23	11.45	11.56	9.61	10.30	9.84	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia**	.10	8.95	10.10	10.76	10.95	9.30	9.95	9.35	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	8.72	10.13	11.28	10.99	8.56	9.06	8.70	11.40	17.10	16.10	19.70	20.45
Portland**		10.20	12.05	12.35	12.20	10.35	10.80	10.20	16.65	18.50	17.45	20.75	20.25
San Francisco**	.10	10.27	11.79[2]	11.55	11.88	10.48	10.50	10.17	15.20	18.30	17.35	22.90	22.20
Seattle**		10.51	11.57	12.50	11.95	10.10	10.65	9.94	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	10.51	11.57	12.50	11.95	10.10	10.65	9.94	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	8.92	10.75	10.68	11.09	8.77	9.29	8.92	11.43	17.48	16.48	21.58	20.83
St. Paul**	.15	8.99	9.74	10.99	11.16	8.83	9.33	8.97	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—¾-2 15/16"; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter. [3] 10 ga. x 48 — 12¢.

(Effective Aug. 29, 1960)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.00	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Lyles, Tenn. *T3*	.....	.....	.....	.....	73.00
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Naville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

‡Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1, I4*, (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container)	Pct
Plain finish—packaged and bulk.	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container)	Pct
Plain finish—packaged and bulk.	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)	
Plain finish—packaged and bulk.	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Add 7½ pct for nuts assembled to bolts)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46
Machine Screws—bulk		
¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 lb
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

TOOL STEEL

F.o.b. mills

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective Aug. 29, 1960)

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25 31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	43.75	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown. *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* wensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3****	173	190	...	...	190	9.00	9.675
Atlanta *A8***	173	191	...	212	197	9.00	9.75
Bartonsville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dsv. *M4***	175	193	...	214	199	9.10	9.85
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***.	173	190	177	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**.	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**.	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	.....	.....	213	9.95	10.50
Rankin Pa. *A5*	173	187	.....	.....	193	9.00	9.55
So. Chicago *R3*	173	187	.....	.....	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50
Sparrows Pt. *B3***	175	.....	.....	215	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	8.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ⅛, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	139.8
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

Furnace, beehive (f.o.b.)	Net-Ton
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

HOW LONG SINCE YOU CHECKED ON PERFORATIONS?

No matter what material your product demands Mundt can supply the exact perforation you need. Steel, brass, copper, monel, bronze, aluminum, zinc, tinplate, lead, stainless steel, coated metals, bonded materials, plastics, and paper are punched as required for every functional and ornamental need.

You can count on Mundt's guarantee that sheets are perfectly flat, straight, parallel on the sides, and free from buckle or camber.

Our modern tool and machine shop is constantly making new dies to add to the tremendous variety of screens available. If you have a special problem we'll gladly supply design and metallurgical assistance.

No job is too small for our careful, personal attention . . . or too large for prompt delivery. Mundt's 90 years' experience is at your disposal.

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SALES ENGINEERING DEPARTMENT

Sun SHIPBUILDING & DRY DOCK COMPANY
CHESTER, PA.

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 65-71% Cr, .30-1.00% max. Si.

0.02% C	41.00	0.50% C	33.25
0.05% C	34.00	1.00% C	33.00
0.10% C	33.75	1.50% C	32.75
0.20% C	33.50	2.00% C	32.50

3-5% C, 53-63% Cr, 2.5% max. Si ... 26.00
4-6% C, 58-63% Cr, 3-6% Si ... 22.50
5-8% C, 58-63% Cr, 3-6% Si ... 22.50
6-8% C, 50-56% Cr, 4-7% Si ... 22.00
4.00-4.50% C, 60-70% Cr, 1.2% Si .. 28.75
0.025% C (Simplex) ... 35.00
0.010% C max, 63-66% Cr, 5-7% Si. 34.50
0.25% C max ... 33.50
0.010% C max, 68-71% Cr, 2% Si max ... 34.50
0.25% C max ... 33.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed delivered, ton lots, 97.25% min. Cr, 1% max. Fe.
0.10% max. C ... $1.29
9 to 11% C, 88-91% Cr, 0.75% Fe ... 1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.
Carloads ... $1.15
Ton lots ... 1.17
Less ton lots ... 1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in x down, packed.
Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	24.50	14.60
Ton lots	29.75	16.05
Less ton lots	31.35	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe
Carloads, bulk ... 24.00
Ton lots ... 27.95
Less ton lots ... 29.45

Calcium-Maganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.
Carloads, bulk ... 23.00
Ton lots ... 26.15
Less ton lots ... 27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.
Ton lots ... 21.15
Less ton lots ... 22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed
Carload lots ... 18.45
Ton lots ... 19.95
Less ton lots ... 21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.
Carload bulk ... 19.20
Ton lots to carload packed ... 21.15
Less ton lots ... 22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 75 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore. ...	11.00
Houston, Tex. ...	11.00
Johnstown, Pa. ...	11.00
Lynchburg, Va. ...	11.00
Neville Island, Pa. ...	11.00
Sheridan, Pa. ...	11.00
Philo, Ohio ...	11.00
Rockwood, Tenn. ...	11.00
S. Duquesne ...	11.00

Add or substract 0.1¢ for each 1 pct Mn above or below base content
Briquets, delivered, 66 pct Mn:
Carloads, bulk ... 13.70
Ton lots packed in bags ... 16.10

Spiegeleisen

Per gross ton, lump, f.o.b., 3% Si max.

Mn	Palmerton, Pa. 10 lb, pig	35 lb, down	Neville Is., Pa. 35 lb
16-19%	$98.00	$96.00	$100.50
19-21%	100.00	98.00	102.50
21-23%	102.50	100.00	105.50

Manganese Metal

2 in. x down, cents per pound of metal delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.
Carload, packed ... 45.75
Ton lots ... 47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.
Carloads, bulk ... 34.25
Ton lots, palletized ... 36.25
250 to 1999 lb ... 39.00
Premium for Hydrogen - removed metal ... 0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn ... 24.00

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn (Bulk)	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	31.10	33.90	35.10
0.30% max. C	29.80	32.60	33.80
0.50% max. C	28.50	31.30	32.50
0.75% max. C, 80.85% Mn, 5.0-7.0% Si	27.00	29.80	31.00

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.3¢ f.o.b. shipping point.
Carloads bulk ... 11.60
Ton lots, packed ... 13.25
Carloads, bulk, delivered, per lb of briquet ... 14.00
Briquets, packed pallets, 2000 lb up to carloads ... 16.40

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, frieght allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe	22.95	21.65
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered. 40% Si, 2 lb Si, briquets.
Carloads, bulk ... 8.00
Ton lots, packed ... 10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si	14.60	75% Si	16.90
65% Si	15.75	85% Si	18.60
	90% Si	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.
Openhearth ... 3.20
Crucible ... 3.30
High speed steel ... 3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb	2.40	3.30	4.55

(Effective Aug. 29, 1960)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads, bulk ... 9.85¢
Ton lots ... 11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo ... $1.50

Ferrocolumbium, 58-62% Cb, 2 in. x D, delivered per pound

Ton lots ... $3.45
Less ton lots ... 3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta ... $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo ... $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton ... $120.00
10 tons to less carload ... $131.00

Ferrotitanium, 40% regular grade

0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti ... $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti ... $1.50
Less ton lots ... $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton ... $255.00

Ferrotungsten, ¼ x down packed per pounds contained W, ton lots delivered ... $2.15 (nominal)

Molybdic oxide, briquets per lb. contained Mo, f.o.b. Langeloth, Pa. ... $1.49

bags, f.o.b. Washington, Pa., Langeloth, Pa. ... $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb

Carload, bulk lump ... 18.50¢
Ton lots, packed lump ... 20.50¢
Less ton lots ... 21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 ... $1.38

Zirconium silicon, per lb of alloy

35-40% del'd, carloads, bulk ... 26.25¢
12-15%, del'd lump, bulk-carloads ... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload ... $5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound ... 30¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ... 18.25¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots ... $1.20

F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up
10 to 14% B ... .85
14 to 19% ... 1.20
19% min. B ... 1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb & over

No. 1 ... $1.05
No. 79 ... 50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd

Ton lots (packed) ... $1.46
Less ton lots (packed) ... 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots ... 2.15

ELECTRICAL POWER
EQUIPMENT IN STOCK

DC MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	3900	New G.E.	Enc. S.V.	475	320
1	3000	New Whse.	Enc. F.V.	525	900
2	2700	G.E.	Enc. S.V.	415	280
1	2250	New G.E.	Enc. S.V.	600	200/360
1	2200	G.E.	Enc. S.V.	600	400/500
2	2000	G.E.	Enc. S.V.	350	230/350
2	1750	G.E.	Enc. S.V.	250	175/330
2	1500	Whse.		600	300/700
4	1500	New Whse.	Enc. F.V.	525	600
2	1400	G.E.	MCF	250	165/300
1	1300	G.E.	MCF-12	300	200/400
1	1200	G.E.	MCF	600	450/600
1	1000	Whse.		500	800/2000
4	1000	GM	D8	600	400/900
2	900	G.E.	MCF	250	180/360
1	850	G.E.	MCF	250	85/170
2	800	G.E.	MCF	250	400/750
2	800	G.E.	MCF	250	780
2	750	G.E.	MCF	600	450/900
1	750	G.E.	M.F.	600	120/360
3	645	S.S.	V.G.	300	1900
4	600	Whse.		250	275/550
1	500	G.E.	MPC-10	250	188/400
2	450	Whse.		250	415
4	400	G.M.	D8	250	300/900
2	400	G.E.	CY-275	300	1040/1500
1	300	Cr.Wh.	H-102 B.B.	230	1200
1	150	Cr.Wh.	CMC-65H	230	1150
1	150	G.E.B.B.	CD	600	250/750
1	150	G.E.B.B.	CDP-125	230	1750
1	125	Cont. B.B.		230	1750
1	100	G.E.	CDP-115	230	1750
1	80	Whse.	SK-123.9	240	2000-4500
1	75	G.E.B.B.	CD-1235-D.P.	600	850

SWITCH GEAR

Large Stock Oil & Air C/BC can furnish in NEMA 1 Enc. or Open Magnetic or Manual Operation. What are your needs & I. C. Requirements.

MG SETS—3 Ph. 60 CY.

Qu.	K.W.	Make	RPM	DC Volts	AC Volts
1	4800	G.E.	450	300	2300/4600
1	2400	G.E.	450	300	2300/4600
1	2000	G.E.	514	600	2300/4600
2	1750/2100	G.E.	514	250/300	2300/4600
1	1750	G.E.	514	600	2300/4600
1	1500	G.E.	720	600	6600/13200
1	1500	Cr.Wh. 4 unit	720	100	2300
1	1000	G.E.	900	600	2300/4000
1	1000	G.E.	720	250	2300/4150
1	1000	G.E.	900	250	4000/6900
1	500	G.E.	900	125/250	440
1	500	G.E.	900	250	2300/4600
1	500 (New)	G.E.	1200	300	2300
1	350	G.E.	900	125	440/2300/4160
1	300	G.E.	1200	250	2300/4000
1	300	G.E.	1200	250	440/2300
1	250	G.E.	900	250	440/2300
1	240	Whse.	900	125	220/440
1	200	Whse.	1200	650	2200
1	200	Mt. Mfg.	1200	250	2300/4000
1	150	G.E.	1200	275	2300
1	150	Whse.	1200	275	2300
1	150	G.E.	1200	125	440
	140	Cr.Wh.	600	125/250	2300
1	100	G.E.	1170	250	220/440
2	100	Cr.Wh.	81160	525	220/550
1	100	G.E.	1200	250	2400/4160
3	75	Whse.	1200	125	440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
3	3333	Whse.	OISC	1	13800 x 2300
1	3000	A.C.	OISC	3	34500 x 2300
3	1000	G.E.	OA/FA	1	13800 x 230/460
3	833	A.C.	OISC	1	4800/2400 x 480
3	833	A.C.	OISC	1	10175/13475 x 2300/4000
2	750	G.E.	Pyranol	1	4800 x 85/55-265/165
3	500	Mal.	C	1	6600/11430Yx480
3	500	Kuhl	OISC	1	13200 x 6600
3	333	A.C.	OISC	1	6900 x 460
3	200	A.C.	CBS	1	2400/4800 x 240/480
3	150	G.E.	OISC	1	33000x2300/4000Y
3	167	G.E.	HS	1	13800 x 240/480
3	100	G.E.	HS	1	4800/8320Y x 120/240

CRANE & MILL MOTORS
230 V. D. C.

Qu.	H.P.	Make	RPM	Type
12	12/14	Whse.	700/600	MCA-30, Series
1	20	Whse.	975	K-5 Series
2	23	G.E.	650	MD8-408 Shunt
1	35	Whse.	480	CK-9 Comp. S.B.
1	35	Whse.	480	CK-9 Sh. R.B.
1	45	Whse.	600	CK-9 Comp. S.B.
3	50	G.E.	650	COM-1830 Comp.
2	50	Whse.	525	CK-9 Shunt R.B.
2	50	Whse.	600	CK-9 Comp. R.B.
1	50	G.E.	525	COM-1830AEB.B.
1	50	Cr.Wh.	550	SW-50 Comp.
1	60	G.E.	500	MD8-414AE2 R.B.
9	125/165	G.E.	625/575	CO-1832 Ser.
1	100	G.E.	475	CO-1832 S.B.
6	100-140	Whse.	500/415	MC-90 R.B.

Above only partial listing of our available stock.

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Dealers Benefit From SA Markets

Used machine dealers in the Detroit area are benefiting some from expanding foreign industrial development.

This is especially true of South America. But the market lacks domestic support.

■ Some used machinery dealers in Detroit are benefiting this summer from expanding foreign industrial development, particularly in South America.

Automakers and suppliers in recent months dipped into Detroit's massive pool of second-hand equipment to furnish eager factories in such lands as Brazil and Argentina.

These countries, many of them boasting industries heavily backed by U. S. dollars, use the machines to make parts for cars, trucks and tractors. At least a handful of Detroit dealers are said to be supplying used machinery that will turn out such parts.

Runs in Spurts—Activity seems to run in spurts for local used machinery suppliers. Last year the same thing occured from spring to fall, roughly six months, before slackening. It resumed again this spring, but some forecasters feel it will soon run its course.

Production machinery specialists say equipment bound from Detroit to European ports is mostly the large, special production type. These are not readily available there. But tool and die dealers say they have been getting feelers from South America and Mexico.

As for the Detroit market in general, the summer doldrums seem to have set in. A dealer, who says the past 60 days have been "miserable," complains he didn't sell a single machine in July until the last week in the month. He sold two for the month. He admits, as far as gross sales go, 1960 is running neck and neck with a year ago.

Inventories High—Inventories of used machines are high in Detroit this season. Continued release of government equipment and the fact that many companies—large manufacturers and small shops—are going out of business, are creating the stockpile. The area continues to draw many customers from outside Michigan. One dealer estimates 90 pct of his sales are to out-of-state buyers.

There is also some pressure on prices, which seem a bit softer than in mid-1959. A good bargainer often saves a few dollars by haggling. But dealers aren't paging through catalogs to reduce list prices.

They seem to have confidence, or at least hope, that the second half of 1960 will bring a little brightness. The hope is tied to strengthening operations by the auto and steel industries.

The auto industry is very quiet. The 1961 tooling programs have ended, and new machines are going into plants that are down for model changeover. It will be quite a few weeks before 1962 tooling work starts coming in.

ROLLING MILLS—STEEL WORKS EQUIPMENT

1—3-HIGH PLATE MILL 40" & 26½" x 112".
1—34" & 22" x 112" PLATE MILL, 3-high.
1—25" & 42" x 66" HOT STRIP MILL, 4-high.
1—3½" & 8½" x 5½" STRIP MILL, 4-high.
2—28" 3-HIGH ROLL STANDS.
1—18" 3-HIGH BAR MILL, single stand.
1—NEW 16" BAR MILL, 3-high, single stand.
1—10" BAR MILL with motor and gear drive.
1—9" BAR MILL 3-high five stands.
1—16" x 28" COLD MILL, 2-high, with 200 HP motor and gear drive.
1—34" x 192" ROLL GRINDER.
1—450 TON DOWN-CUT CROP SHEAR, 14" stroke, length of knives 28"
1—OPEN SIDE BAR SHEAR Williams & White No. 14½, 1¾" round.
1—SHEAR, 1" x 110" plate.
1—LEVELLER, 1" x 104" plates.
1—ELECTRIC MELTING FURNACE, 1-ton capacity 800 KVA transformer.

1—ROLL LATHE, ENCLOSED HEADSTOCK, up to 40" dia. rolls.
1—MAGNETIC SEPARATOR double pulley, Stearns.
1—SIDE TRIMMER, Stroins, maximum width 48" makes 2 cuts 3/16" mild steel.
1—HALLDEN STRAIGHTENING and cutting-off machine, capacity 5/16" to ⅝" dia. x 14 ft.
1—POINTER, tube 2" O.D. x ¼" wall maximum.
1—1500 HP GEAR DRIVE, 7.5 to 1 ratio.
1—1200 HP GEAR DRIVE, 295 to 30 RPM.
1—1200 HP GEAR DRIVE, 353 to 94.5 RPM.
1—600 HP GEAR DRIVE, 1.698 to 1.
1—400 HP GEAR DRIVE, 8.2 to 1.
1—800 HP MOTOR, 2300 volts, 3 phase, 60 cycle, 293 RPM.
1—600 HP MOTOR, 2300/4600 volts, 3 phase, 60 cycle, 450 RPM.
1—400 HP MOTOR, 440 volts, 3 phase, 60 cycle, 450 RPM.
1—400 HP MOTOR, 2300/4600 volts, 3 phase, 60 cycle, 450 RPM.

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LATE MODELS—MDNA
MONEY BACK GUARANTEE

1300-Ton Nat'l. Maxipres, 80 SPM, 10" Str., 1955
920-Ton Toledo #60, Bed 47x72, Str. 20", 1943
700/390-Ton Toledo #797E, Bed 127x83, Dbl. Act. Toggle, Air Clutch & Cushion
600-Ton Farracute E601, Coining, Str. 6". 30 SPM, 1950
440-Ton Bliss #210, Bed 37x36, 35 SPM, Side Shear, Str. 16", Mfg. 1953
440-Ton Toledo #59¼, Bed 41x48, Str. 12"
295-Ton Toledo #58½B, Bed 43x42, Str. 12"
150-Ton Cleve. 60-D-84, Bed 86x46, Str. 14"
3000# Chambersburg "Coco Drop" Hammers, 1951

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4½"x15" MAS-VR4A #4MT, 2500 RPM, Preselection, Hyd. Clamping, program control.
12"x26" MAS-VR103, #6MT, 9' Vert. Cap 9", Hole cap., 20 HP 1400 RPM

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FOR ROLLING MILLS & REELS

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(1)—3000-KW Allis-Chalmers, 600-VDC, M-G Set with 5000-HP Motor, 13800/6900/4160-Volt.
(1)—1500-HP Westinghouse Motor, 300/700 R.P.M. and
(1)—1250-KW M-G Set, 600-VDC with 1750-HP Motor, 2300/4000-Volt.
(1)—1400-HP G.E. Motor 165/300 R.P.M. and
(1)—1200-KW M-G Set, 250-VDC with 1750-HP Motor, 2300/4000-Volt.
(2)—750-HP Westinghouse Motors, 300/700 R.P.M. and
(1)—3-unit M.G. Set—(2) 600-KW Generators and 1750-HP Motor, 2300/4000-Volt.
(2)—600-HP Allis-Chalmers Motors, 300/600 R.P.M. and
(1)—1000-KW G.E. M.G. set, 600-VDC with 1450-HP motor, 2300/4000-Volt OR
(1)—3-unit M.G. set (2) 600-KW, 600-VDC generators with 1450-HP Motor, 2300/4000-Volt.
(2)—645-HP S.&S. Motors, 850/1200 R.P.M. operated in series from a 1000-KW M-G Set at 600-VDC with 1450-HP Motor, 2300/4000-Volt.
(2)—300-HP Westinghouse Motors, 300/600 R.P.M. and
(1)—500-KW Westinghouse M.G. Set, 250-VDC, with 700-HP Motor, 2300/4000-Volt OR
(1)—3-unit Westinghouse M.G. Set with (2) 250-KW generators and 700-HP Motor, 2300/4000-Volt. Also can supply with this M.G. Set—
(2)—235-HP Westinghouse Motors, 325/975 R.P.M.

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20 TONS—2½" x 4½" x 18'0" FLATS
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9/16" Cleveland Model A, m.d., 1943
1½" Foote-Burt Single Spindle, m.d., 1943
4 spindle 1⅝" Cleveland, Model M, m.d.
4 spindle 2" Model K Cleveland, m.d.
2½" Cleveland, m.d., Model A
3¾" Cleveland Model A Single Spindle, m.d., late
5½" Cleveland Model A, single spindle, m.d.
No. 4D Potter & Johnston, m.d., late

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Victor Nut Facing Machine, m.d., cap. ⅜" to 2" nuts
1½" Landis 2 spindle, m.d.
1½" Landis Bolt Threading Machine, double head stay bolt, m.d.

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Model DB-102 Excello Double End Boring Machine, m.d.
No. 47A Heald Single End Borematic
No. 49 Heald Double End Borematic, m.d.

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2½", bar, Model 25RT Giddings & Lewis, table type
3½" bar Cincinnati Gilbert Horizontal, Boring, Drilling & Milling, floor type
4" bar Universal Horizontal Table Type, m.d., late and good
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5½" bar Niles-Bement-Pond, m.d.
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16" Bullard Mult-Au-Matic, m.d.
24" Bullard Spiral Drive, m.d., 1944
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53" Niles Heavy Pattern, m.d., p.r.t.
54" Bullard New Era, m.d.
60" Bullard, m.d.
84" Cincinnati H.D. Hypro, m.d., p.r.t., late
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SPECIAL—13' 3/8" Shear, 20" Gap, Extra blades, 10' Squaring Arm.....$5,000.00
10' 3/8" Shear, 16" Gap, Extra blades.
10' 14 ga. Pexto Shear, Model S-2120
60 ton Niagara Punch Press, 22" throat
50 ton Federal Punch Press, #5 OBI
43 ton Niagara Punch Press, 20" throat
36 ton L & J Punch Press, #4 OBI
20' x 1" cap. Pyramid Type Bending Roll
6' x 3/8" cap. Initial Type Bending Roll
8' 12 ga. Sturdybender Press Brake
5' 14 ga. Dreis & Krump Press Brake
4' 18 ga. Dreis & Krump Press Brake

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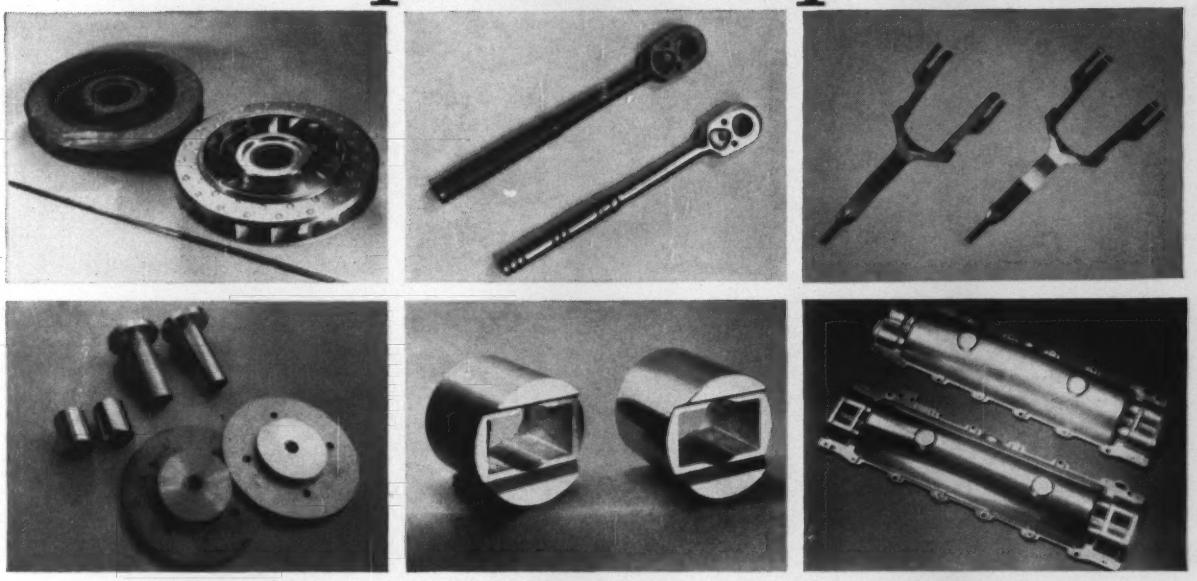

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